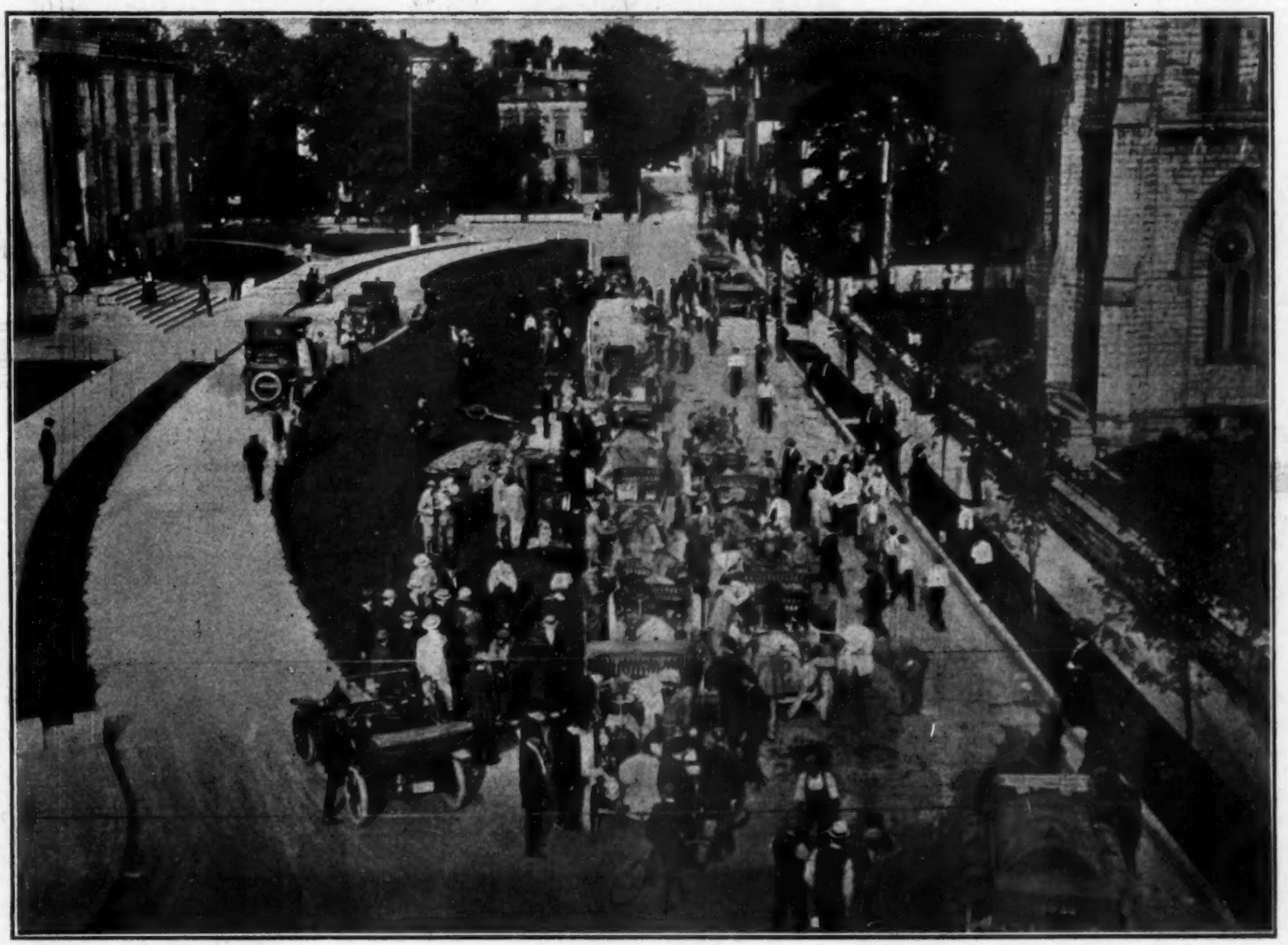
THE AUTOMOBILE

Nine Days of Glidden Besmirched Records

SHEFFIELD, ALA., June 16—To-day's run of 119.7 miles was the shortest in the tour. In crossing the numerous fords several contestants swung rubber aprons over the radiators to prevent water splashing inside, but there was no use for such precautions. This act on the part of many provoked considerable discussion as to whether such was permissible or not and the referee waived all penalties as might have been imposed for such work. In spite of the shortness of the day's run and the comparative ease of the roads, penalties were imposed as follows: Chicago trophy class—No. 100 Moline, 9 points for oiling spring shackles in the noon control. No. 105 Parry, 12 points for fastening up a muffler. No. 108 Cartercar, 2 points for a temporary repair of the clutch pedal, and No. 111 Westcott, 2 points for working on a loose seat.

MEMPHIS, TENN., June 17—Never before in a Glidden tour has there been so strenuous a trip as to-day's 162 miles from Sheffield to Memphis. The route to Corinth, the noon control, 62 miles, offered the worst possible roads imaginable—the merest trails along the sides of hills covered with underbrush or across bog holes in the swamps. Over such an impossible course the cars traveled on 18- and 20-mile-an-hour schedules. As a result eleven contesting cars were late at Corinth, leaving only four that checked in there on time, these four being No. 1 Premier, No. 5 Chalmers, No. 9 Parry and No. 7 Maxwell. The others were late from one hour to over two hours. For over 50 miles the roads were horrible and literally took the heart



HOW THE CONTESTING AUTOMOBILES WERE NESTED AT THE CONTROL AT LOUISVILLE

and patience out of the well-nigh exhausted car crews.

Among the Glidden contestants No. 2 Premier received 121 points for late arrival at control and 4 points for adjusting the igniters in its make-and-break system of ignition. No. 3 Chalmers received all told 162 technical penalties for such work as tightening terminals, putting on a new water line gasket, work on the steering gear, using a new spark plug and other minor difficulties. No. 4 Chalmers, driven by Joe Matson, received 89 points for losing his muffler and trying to replace it, and other car work. No. 6 Cole lost 3 points in adjusting brakes. No. 10 Glide had 29 points for lateness. No. 11 Ohio lost 11 points on technical matters and 54 on time. No. 14 Pennsylvania 6 was withdrawn during the day and received its total of 1,000 points for this withdrawal, but previous thereto had been charged with 338 points on technical matters, including as they did work on the muffler, straightening a steering arm, adding a new muffler pipe and performing other minor work. No. 15 Cino was 54 minutes late at the noon control, exclusive of the 3-minute time allowance.

In the Chicago trophy division every car contesting received a penalty for being late and three of them received technical penalties. No. 100 Moline was given 3 points for lateness, but had a clean technical score. No. 101 Moline received 6 points for filling the radiator outside of controls and 44 points for being late. No. 102 Moline was clean technically, but was taxed 39 points for lateness. No. 103 Lexington was given 2 points for tightening a steering arm and 222 for lateness. No. 105 Cole was withdrawn for having burned out a crankshaft bearing caused by the oil pipe breaking when crossing the bottom lands. No. 106 Falcar was clean, but driver Van Sicklen lost 83 points on time. No. 111 Westcott was also clean technically, but received 142 bad marks for lateness.

The Lexington 110 was withdrawn during the day because of breaking a steering arm and not having the necessary spare parts on hand. No. 108 Cartercar was levied against to the extent of 143 points for repairing a clutch pedal, working on distance roads, and repairing the radiator support parts. Its time penalties are not known to date.

LITTLE ROCK, ARK., June 18—Although the cars checked out of Memphis this morning at 7 o'clock, it was midnight before many reached the Marion House here to-night, making in all seventeen hours on the road. This was due to two ferries that had to be crossed by all of the tourists, the first being at Helena over the Mississippi, and the second at Clarendon over the White river. In order to get the cars across the river the Helena motorists secured a large lumber barge on which all of the cars were loaded at one time and were then towed across the stream to Helena. In midstream a meeting was called on deck, Chairman Butler issuing final instructions on the *modus operandi* of the checking system at the ferry; but a long delay followed before the cars reached *terra firma* and started on.

The 63 miles from Memphis to Helena were novel in that the route lies for miles along the base of the levee used for preventing the Mississippi overflowing its banks. The going was lumpy, and as a result some of the cars suffered more or less penalization.

A—Cartercar, No. 108, between Louisville and Bowling Green
B—Chalmers-Detroit Car Stuck in the Mud
C—The Cole, No. 104, Checking Out in the Morning
D—Premier, No. 2, Crossing a Ford En Route
E—The Cino Car Making Good Time on the Road

The second stage of to-day's run, from the Mississippi to Clarendon, on the White river, was over a monotonous, flat country used largely in the cultivation of cotton and corn. The road was one of the easiest of the tour so far and the schedule was easily maintained.

At Clarendon the ferry facilities comprised two barges lashed side by side. Instead of simply carrying the cars across the river

a ten-mile trip down stream was made and the cars landed in the midst of a forest through which they were run for ten miles to the village of Roe, where they were checked out at 6 o'clock for the 90-mile run to Little Rock.

The roads were straight, with wire fences on either side. The rice fields around Stuttgart were flooded with water that appeared to be some 6 inches deep, and above the surface of the water the heads of the rice plants were seen. Leaving Stuttgart the same flat country was encountered until within twenty-five miles of Little Rock, when rolling territory was invaded. This run was made after sundown by all of the tourists, the acetylene headlights and oil side lamps being seen flickering all over the country as the night slowly moved along. This was the first occasion in a Glidden tour in which a night run has been indulged in, but no difficulty was experienced in following the route.

F—Moline, No. 101, Between Bardstone and Bowling Green
G—Nashville Control—Putting the Cars Under Cover
H—Maxwell, No. 10, Between Louisville and Bowling Green
I—The Falcar, a Prominent Chicago Trophy Contender

Despite the easy going No. 2 Premier, driven by Ballinger, had to solder its gasoline tank, which cost 76 points. Besides this it was 21 minutes late at Clarendon control and lost 3 points for taking on extra gasoline at Helena, giving the total for the day at 118 points.

No. 9 Parry had its muffler almost torn off, and 4 minutes were needed to complete the repair; a fan belt was replaced and 6 more points added for tightening front wheel and tie rod bolts. The total penalty against the Parry was 20 points.

No. 11 had 114 points levied against it, caused by taking off and repairing the radiator, and after doing this once having to do it a second time. Hand in hand with the radiator difficulties was that of taking on water and oil.

In the Chicago trophy field Moline No. 101 lost 14 points for putting water in the radiator three times outside of control, adding oil once and tightening a spark plug.

No. 108 Cartercar received all told 405 points, made up as follows: 393 for replacing a broken spring and the remainder for taking on gasoline, oil and water outside of control. The small Cartercar and Cole No. 6 were withdrawn to-day.

HOT SPRINGS, ARK., June 19—To-day's run of 53 miles from Little Rock here was unique in that it is the first time in which a Sunday was used for a run. The 191-mile trip to Texarkana over rough roads was too severe a one-day test in view of the grueling the cars have already received and it was decided to take the 53-mile run here to-day and at the same time give all hands a chance to use the hot baths.

When the final reckoning was made this afternoon it was found that several cars had received penalties, one of the most serious being No. 103 Lexington, which struck a very soft spot in the road and broke the right side member of the frame just back of the front axle. Driver Moore at once withdrew from the contest, but later to-day reconsidered his course.

The Glidden ranks suffered a couple of penalties to-day, one being No. 15 Cino, which received 16 points for tightening the hub flange bolts in the left rear wheel. No. 8 Cartercar suffered 28 points on work tightening spring clips and 13 more for late arrival. No. 11 Ohio suffered 18 points for taking on water due to a leaky radiator and also 18 points for lateness.

No. 108 Cartercar fell out with a broken rear axle when a little over 10 miles out of Little Rock and the other Cartercar No. 8 in the Glidden was late, due to helping the disabled car out of its dilemma.

TEXARKANA, ARK., June 20—To-day's run of 138 miles from Hot Springs to here has resulted in eliminating two of the three remaining perfect scores, and to-night there is but one car running with a perfect road score to date and that car is No. 5 Chalmers, driven by W. Bolger. The other perfect scores to

pass out of existence to-day were: No. 1 Premier, driven by Ray MacNamara, and No. 7 Maxwell, driven by H. E. Walls. Others penalized were No. 2 Premier, No. 4 Chalmers, No. 8 Cartercar, No. 9 Parry, No. 11 Ohio, No. 15 Cino in the Glidden, and No. 106 Falcar, No. 101 Moline and No. 103 Lexington.

DALLAS, Tex., June 21—To-day's record run of 217 miles found No. 3 Chalmers, No. 4 Chalmers, No. 7 Maxwell, No. 15 Cino, No. 102 Moline, No. 107 Maxwell, No. 106 Falcar among the sufferers. In 1909 five had clean road scores at the finish; this looks like a no-clean-score run.

TECHNICAL STANDING OF CARS IN GLIDDEN TROPHY

No. Car.	1st	2d	3d	4th	5th	6th	7th	8th
1—Premier	0	0	0	0	0	7	0	0
2—Premier	0	0	0	4	97	0	10	0
3—Chalmers	0	20	0	162	0	0	0	18
4—Chalmers	2	6	0	89	0	0	9	6
5—Chalmers	0	0	0	0	0	0	0	0
6—Cole	75	0	3	withdrawn				
7—Maxwell	0	0	0	0	0	0	6	4
8—Cartercar	0	0	0	135	0	28	595	0
9—Parry	3	3	0	0	20	0	8	0
10—Glide	0	0	0	0	0	0	0	0
11—Ohio	75	0	0	0	0	withdrawn		
12—Ohio	100	0	48	withdrawn				
14—Pennsylvania	1042	0	withdrawn					
15—Cino	0	0	0	0	0	32	45	0

TECHNICAL STANDING OF CHICAGO TROPHY CARS

No. Car.	1st	2d	3d	4th	5th	6th	7th	8th
100—Moline	0	0	9	0	0	0	0	0
101—Moline	0	0	0	6	14	0	192	0
102—Moline	0	0	0	0	0	0	3	6
103—Lexington	0	0	0	2	0	20	842	0
104—Cole	0	0	0	0	withdrawn			
105—Parry	0	4	withdrawn					
106—Falcar	0	0	0	0	0	0	0	0
107—Maxwell	0	0	0	0	0	0	11	12
108—Cartercar	0	0	2	143	405	not reported		
109—Cartercar	46	0	104	withdrawn				
110—Lexington	4	0	0	withdrawn				
111—Westcott	0	2	0	0	0	withdrawn		

Distant Verdure Always Looks Greenest

BY MISS CORA A. MOORE

THE majority of motorists know their long runs thoroughly enough, but they would be distinctly at a loss were they called upon to designate a round tour from New York which could be accomplished in a day's time at a comparatively easy pace, and yet afford an entrancing diversity of scenery, good accommodations and fair roads.

But there are such journeys, and the autoist may, very near home, with a little stretch of the imagination, fancy himself an intruder amid the glories of the Berkshire or Shinnecock Hills, or even of the matchless Killarney Lakes.

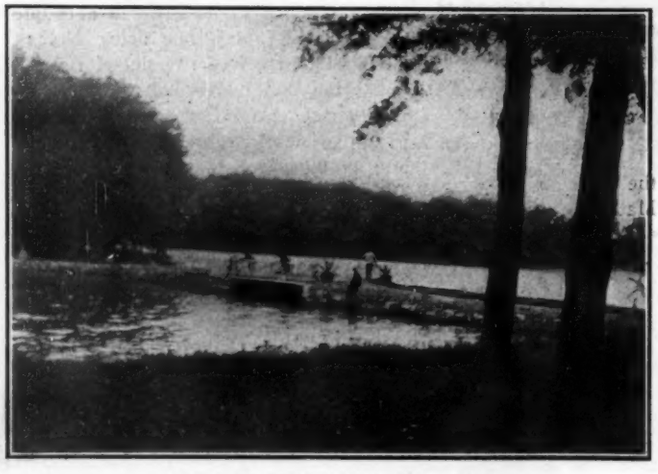
The Automobile Blue Book was utilized during an interesting path-finding trip around New York City in an attempt to show that it is not necessary to go on long tours in order to enjoy the automobile and all that it offers. The Riverdale Avenue route on the road to Yonkers leads to the autoist's best view of the Palisades. Local history (Baedeker feature of the Automobile Blue Book) was studied to good advantage.

One of these trips whose outline may be useful or inspiring to that one-day-long auto wanderer lies out through Yonkers, either through Broadway or Riverdale avenue to Brewster. Of course, exact roads and turnings, mileages and all that information is given in the Blue Book, and the way is plentifully supplied with direction signs. At an easy rate, with a none too early start, it may be completed with two hours of daylight to spare.

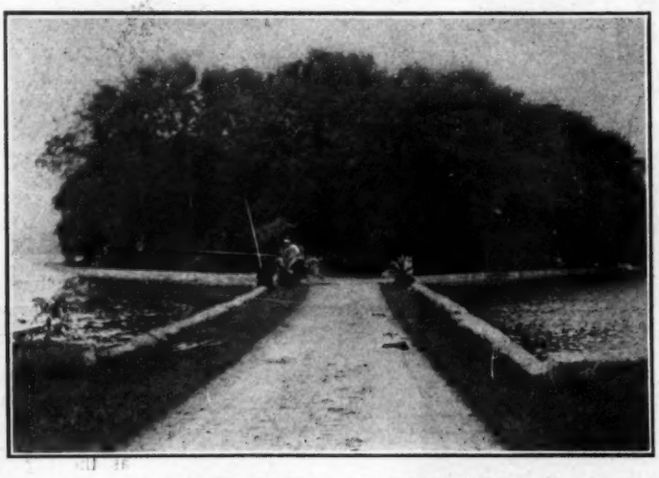
While Yonkers admits that it is not so large as New York, it insists that in point of age the larger city has "nothing on" the smaller. It started its existence during the days of New Amsterdam as the manor of Colendock, the property of Patroon Van der Donck. Yonkers got its name in a strange way. Van der Donck, coming here in 1642, lived in so much fashion that his property came to be called "de jonkheer's landt"—the gentleman's land—from which the translation to Yonkers is easy.

The pride of the town is the very wonderful Colonial relic and heirloom, the Phillipse Manor House, where lived Washington's first love, Mary Phillipse. During the Revolution she was accused of treason and the house confiscated by the Government. Phillipse Manor House is still in good condition and is used by the municipal government of Yonkers as a city hall. It is credited with having been erected in 1682.

The tablet on the monument near Dobbs Ferry tells how the old house still standing there was once the headquarters of General Washington, and a little farther on is the André Monument, that marks the spot of the capture of



A Spot for Fishing Near Lake Mahopac



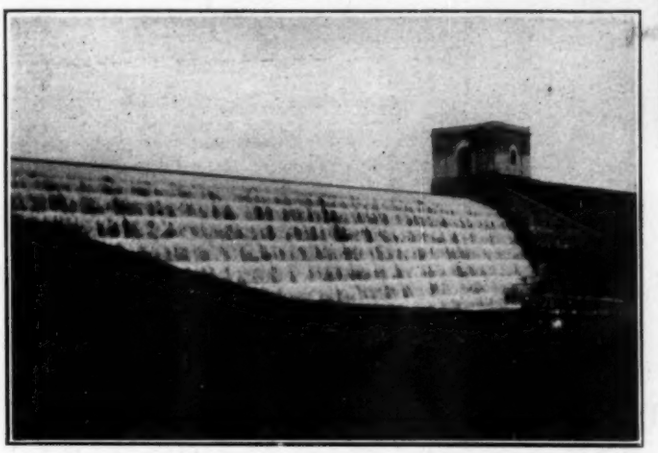
An Island Approach to Lake Mahopac

the unfortunate and misled British major with the evidence of treachery concealed in his boot. This strip of country was the theater of much Revolutionary history. War swirled through Westchester in those days and it was in the Livingston mansion that Washington met Rochambeau in 1781 and planned the campaign of Yorktown. In May, 1783, under this same roof, the papers were signed by which England renounced all claims to America.

Between Dobbs Ferry and Tarrytown are some of the most magnificent private estates in the country.

Tarrytown is mightily changed in less than a hundred years, but there is that charm in the atmosphere that causes us to wonder not that the good wives gave it its name because their husbands were wont to linger there on market days.

Up the hill from the town and one may look back to the left for a fine view of the Hudson, with the manufacturing plant of the Maxwell-Briscoe Motor Company looming up prominently; then on to Scarboro and Briarcliff Manor. Here the road turns along past Echo Lake, and half a dozen miles farther on the first of the chain of beautiful Crotona lakes which assuage the thirst of New York comes into view. Passing the first bridge



The Dam at the West Branch Reservoir

the road runs alongside the lake with many a turn, each of which has some charming view to offer. Through Yorktown Heights and into Amawalk the road extends, and follows for

Just Before the Good Roads Were Reached

the entire length of the Muscoot reservoir, bearing northward until the beautiful Lake Mahopac is reached.

Over the bridge at the head of the West Branch reservoir the road leads on toward Carmel, then follow Brewster and Sodom, after which Peach Lake awaits in refreshing beauty, and by its side the State road. Then comes North Salem, with its rather lugubriously named resort, "The Port of Missing Men."

From this point the way is straight south to Bedford, through New Castle Corners to Armonk. In a few minutes more and the path is running along the east side of Kensico reservoir and then, suddenly, we are away from all country things and in the midst of the very citylike bustle of White Plains.

All that remains is the spin in through Yonkers to New York. In all less than 135 miles have been covered, and there is still time to dress for dinner.

Chadwick Gathers Laurels in Baltimore Climb

BALTIMORE, MD., June 20—The big event in the Baltimore hill climb, the free-for-all on Saturday last, was carried off with flying colors by the big 90-horsepower Chadwick car, entered by the Chadwick Engineering Works and driven by Len Zengle. The ascent was made in the remarkable time of 36 seconds flat for the six-tenths of a mile, breaking last year's record of 43 1-5 seconds. It is the opinion of motorists that this performance will stand unequaled for some time to come. For taking the honors in the feature event the Chadwick car gets the handsomest of the silver cups offered by the Automobile Club of Maryland, under whose auspices the climb was held.

There were two prizes offered in this event, the other one being for the four-cylinder car that made the best showing in the contest. This prize was captured by the 60-horsepower Stearns entered by Joel G. Nassauer, chairman of the committee which had the contest in hand, and driven by Clarence L. Hahn. This car negotiated the distance in 49 1-5 seconds. It must be understood that this car did not finish second, but it received the prize under the conditions of the race, which were made so as to give the amateur performers a chance to shine as well as the big fellows. The second car in the event was a 50-horsepower Matheson, entered by the Matheson Motor Car Campany, and driven by J. A. Turner. The time was 44 seconds. The third car was another Chadwick of 60 horsepower, which completed the ascent in 46 seconds. This entry was that of W. W. Lanahan and was driven by Wilfrid Smith.

The races began promptly on scheduled time, at 2 o'clock. They were held on the Belvedere Hill, from Falls avenue to Roland avenue, the grade of which is 15 per cent. With the exception of a rough starting place, the hill was in excellent condition. The mud on Belvedere avenue, just west of the Falls road, was very heavy because of the continued rainy weather and it was necessary to lay a large quantity of cinders.

There were nine other classes besides the free-for-all race and the motorcycle event. The time made by the winning cars in these events was considered very creditable. In addition to capturing the amateur prize in the free-for-all contest, the Stearns 60-horsepower car, entered by Joel G. Nassauer, also won two other events—the Class G for cars selling for $4,001 and over and Class K for amateur drivers only in cars selling for $3,001 and over. In the former event the car was driven by Clarence L. Hahn in 50 3-5 seconds, while in the amateur event Mr. Nassauer drove his car up the hill in 51 4-5 seconds.

Matheson cars were also conspicuous as winners, carrying off three of the events scheduled. In Class E and Class H the 50-horsepower Matheson car, entered by Edgar F. Dobson and driven by himself, was the winner. The former event was for cars selling for $2,001 to $3,000, while the Class H event was for amateur drivers only in cars selling for $3,000 and under. Mr. Dobson's time in the Class E event was 49 1-5 seconds, while in the amateur contest his time was 48 3-5 seconds. The other Matheson car to carry off the honors was in Class F for cars selling for $3,001 to $4,000. This car was driven by Guy Reynolds and entered by the Matheson Motor Car Company. The time was 47 seconds.

The 30- and 40-horsepower Buick cars entered by the Auto Outing Company won the Class C and Class D events. The former was for cars selling for $1,201 to $1,600 and the latter for cars selling for $1,601 to $2,000. In the Class C event the Buick, driven by G. B. Hall, made the climb in 57 1-5 seconds, while in Class D the Buick's time was 56 seconds flat. Charles Jenkins drove the car in this event.

Howard Bauer, in a 30-horsepower Oakland, entered by the Oakland Motor Car Company, was the winner in Class B for cars selling from $801 to $1,200. The time was 1.01. The opening event was taken by the Hupmobile entered by Little Joe's Auto Exchange and driven by T. Wilson Simpson. The little car made the distance in 1.21 1-2. The undertaking was conducted with the greatest care and praise was meted out freely by the contestants and the patrons of the event, who gathered in force at points of vantage.

Those in charge of the meeting were: Hill climb committee, J. G. Nassauer (chairman), H. M. Luzius and F. H. Hack, Jr.; referee and representative of A. A. A., Dr. H. M. Rowe; judges, C. Howard Milliken, Osborne I. Yellott and James Stone Reese; timers, Dixon C. Walker, Harry Weiler, F. S. Bliven and J. M. Zamoiski; technical committee, E. W. Orr, J. M. White and Lee Trembley; clerk of course, Thomas G. Young; starter, Howard A. French; assistant starter, Frank Olmstead; scorer, Thomas E. Brian; announcer, Harry E. Mayer. The summaries:

Class A—$800 and under—

No.	Car.	H. P.	Driver.	Time.
1.	Hupmobile	20	T. W. Simpson	1.21 1-2
2.	Hupmobile	20	Nat Tuttle	1.43 1-2

Class B—$801 to $1,200—

1.	Oakland	30	Howard Bauer	1.01
2.	Warren-Detroit	30	Harry Reis	1.06 1-2
3.	Ford	20	A. M. Eastwick	1.08 3-4

Class C—$1,201 to $1,600—

1.	Buick	30	G. B. Hall	0.57 1-5
2.	E-M-F	30	M. C. Jones	1.05 1-2
3.	Crawford	28	A. A. Miller	1.07

Class D—$1,601 to $2,000—

1.	Buick	40	Chas. Jenkins	0.56
2.	Oakland	30	Howard Bauer	0.56 1-2
3.	Buick	30	Geo. Jenkins	1.02

Class E—$2,001 to $3,000—

1.	Matheson	50	E. F. Dobson	0.49 1-5
2.	Chalmers-Detroit	40	Jos. F. Janin	0.58 2-5
3.	Oldsmobile Special	40	C. R. Meisner	1.13 2-5

Class F—$3,001 to $4,000—

1.	Matheson	50	Guy Reynolds	0.47
2.	Knox	40	John Goodwin	0.58 1-5

Class G—$4,001 and over—

1.	Stearns	60	C. L. Hahn	0.50 3-5
2.	Chadwick	60	J. R. Dungan	0.52

Class H—Amateurs, $3,000 and under—

1.	Matheson	50	E. F. Dobson	0.48 3-5
2.	Chalmers-Detroit	40	Harry Reis	0.56 1-5
3.	Crawford	28	Wm. Delon	1.03 2-5

Class K—Amateurs, $3,001 and over—

1.	Stearns	60	J. G. Nassauer	0.51 4-5
2.	Chadwick	60	W. W. Lanahan	0.52
3.	Stearns	60	S. A. Nattans	1.28

Class L—Free-for-all—

1.	Chadwick	90	Len Zengle	0.36
2.	Matheson	50	J. A. Turner	0.44
3.	Chadwick	60	Wilfrid Smith	0.46

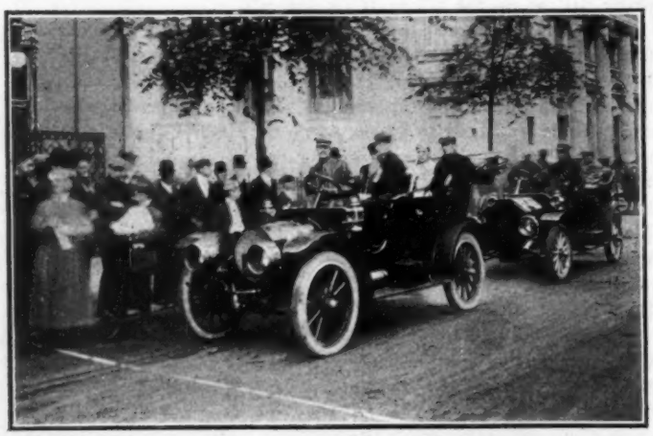
Eleven Perfect-Score Cars in New Jersey Run

NEWARK, N. J., June 20—Under extraordinary conditions of road and weather, nineteen out of the total list of thirty-four starters in the annual endurance run of the New Jersey Automobile and Motor Club finished the full course Saturday. The distance was 290.6 miles—twice around a measured course of 145.3 miles. In perfect weather the run would prove difficult enough on account of its unusual length and stiff hills, but after a long series of rainstorms, which rendered the crowned roads perilous in places and the hills well-nigh unnegotiable, a cloudburst, tornado and a pelting hailstorm added just the touch necessary to make the trip answer to Sherman's definition of "War."

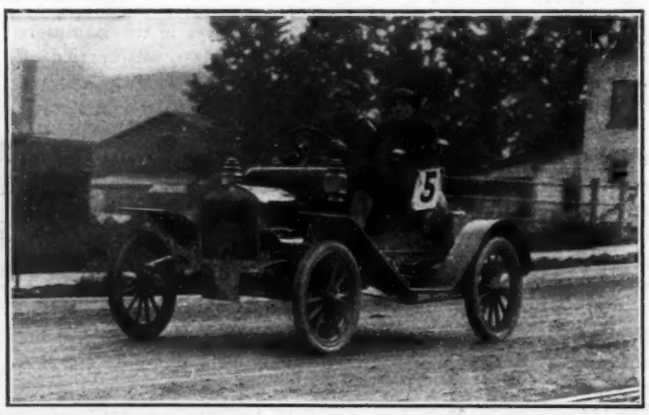
The blow fell during the first half of the second round, when most of the cars were in the vicinity of Green Pond Mountain, as difficult a bit of hill climbing as there is in this part of the country. Suddenly the black clouds emptied themselves and thousands of tons of icy pellets, propelled on the wings of a 60-mile wind, whistled about the heads of the contestants like the projectiles from a battery of machine guns.

Some of the cars had succumbed during the first round, but it was the hail that caused the vast bulk of the trouble. It put out a whole platoon of automobiles and left them standing at various points in the hills while their crews sought shelter in the mud and water under the cars.

Eleven cars completed the run under these conditions with perfect scores and checked in on the minute in the presence of a vast crowd that lined the last mile of the course and surrounded the clubhouse in Newark. There would have been one more clean score if a series of street cars had not blocked Buick, No. 17,



Carlough's Perfect-Score Franklin at the Start



Baby Maxwell on Road Between Dover and Bloomfield

about 200 yards from the finishing line, as the car was but 1 minute 52 seconds late.

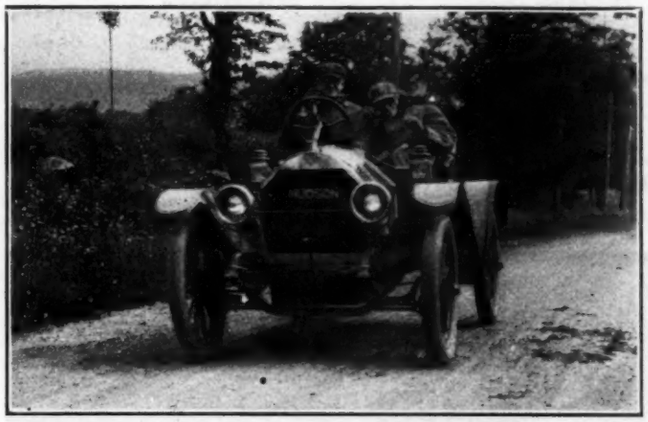
The higher class runabouts made the best showing with four perfect scores and only two absentees at the finish.

There was a large amount of tire trouble all along the route and the tremendous grades and the mud brought on considerable carbureter difficulty and heating of the motors.

The course was from the Newark headquarters of the club, north to Newfoundland, west to Hackettstown, south to Flemington and east to Newark. The start was at 5 o'clock in the morning, and the finish at 8 o'clock at night.

The event was conducted under the direction of the contest

committee, of which H. A. Bonnell, assistant general manager of the A. L. A. M., was chairman. Associated with Mr. Bonnell were A. B. Le Massena, secretary of the club,, F. C. J. Wiss, De Witt C. Reynolds and B. F. Hurd. The referee was Jacob Haussling. There was no technical examination of the cars after the finish, as under the conditions of the race the awards were made upon the showing of the cars on the road. The observers were drawn largely from the ranks of college students, but as the penalized cars did not finish in considerable numbers, their work was not heavy. The New Jersey laws prohibiting the use of



Humphreville's Hudson near Morristown

chains on some of the roads, while allowing them on other parts of the course, puzzled some of the drivers and injected an element of uncertainty in attempts to pass some of the cars on steep grades. The Simplex tore down a section of fence on the first round, but neither car nor crew suffered injury. Aside from that accidents were rare.

The course did not pass by directly the new country headquarters of the club near Butler. Work is being pushed on the additions to the splendid buildings and by next Saturday it is believed that the place will be ready for occupancy.

The tabular score of the run is as follows:

No.	Car.	H. P.	Entrant.	Score.
Class A—Touring cars listed at under $1,600				
34	Cadillac	30	I. M. Uppercu	Perfect
20	E-M-F	30	G. F. Eveland	Did not finish
26	Mitchell	30	F. L. C. Martin	Did not finish
32	Regal	30	E. S. Hilton	Stripped gear, did not fin.
Class B—Touring cars listed at $1,600 and over—				
15	Franklin	28	E. D. Carlough	Perfect
19	Buick	30	J. C. Bell	Perfect
28	Buick	30	James W. Ward	Perfect
17	Buick	30	J. C. Bell	2-points; late at finish.
9	Am. Simplex	50	H. F. Seibert	3-points; stalled motor
36	Packard	30	A. Hollendar	Disqualified; early at fin.
8	Auburn	32	J. J. Meyer	Withdrew after 1st round
11	Haynes	30	E. H. Paddock	Did not finish
18	Buick	30	J. C. Bell	Did not finish
21	Fiat	25	Philip Hilton	Did not finish
25	Selden	35	P. L. Munford	Did not finish
38	Johnson	30	Carl F. Johnson	Did not finish
Class C—Roadsters listed at under $1,200—				
24	Hudson	25	A. H. Humphreville	Perfect
27	Hupmobile	20	F. L. C. Martin	Perfect
29	Ford	20	L. J. Wycoff	Perfect
4	Maxwell	22	J. W. Mason	7-points; motor stops
5	Maxwell	14	J. W. Mason	15-points; motor stops
30	Hupmobile	20	F. L. C. Martin	Broke wheel at start
31	Overland	25	W. F. Ackor	Did not finish
33	Hupmobile	20	F. L. C. Martin	Did not finish
Class D—Roadsters listed at $1,200 and over—				
6	Maxwell	30	J. W. Mason	Perfect
10	Haynes	40	W. E. Shuttleworth	Perfect
22	Jackson	50	F. L. Kramer	Perfect
23	Columbia	29	W. J. Tynan	Perfect
14	Franklin	42	E. D. Carlough	1-point; stalled motor
35	Cadillac	30	I. M. Uppercu	3-points; motor stops
7	Overland	40	George L. Riess	70-points; lateness
3	Mercer	30	R. A. Greene	Finished after limit
37	Chalmers	30	Frank J. Radel	Did not finish
39	Haynes	30	James D. Rourke	Did not finish

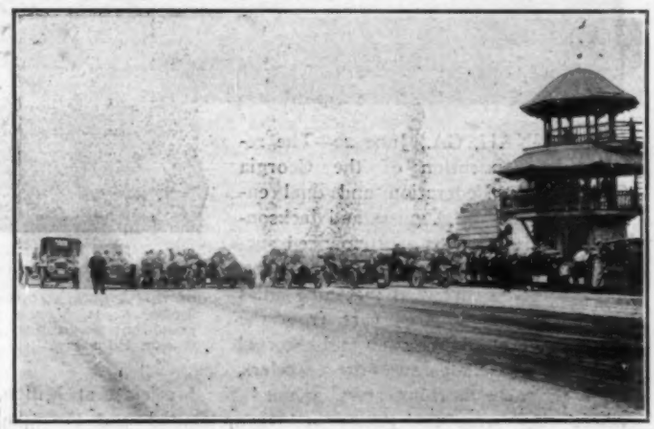
Quaker City Summer Meet Marred by Storm

PHILADELPHIA, June 20—Rain put a stop to the fourth annual Summer race meet of the Quaker City Motor Club, at Point Breeze track, Saturday afternoon. E. R. Bergdoll in a Benz and Ralph De Palma in a Fiat were having a battle royal for the honors in the fifty-mile race, with the latter about 10 seconds in the lead, and the field strung along for miles behind, when the storm, which had been threatening for half an hour, came down upon the track. It wasn't an ordinary rainstorm; it was a cloudburst, with hail on the side, and in a minute the red flag was wig-wagging the contestants to shelter. Thirty miles had been covered when the race was stopped, and as De Palma had a fifty-yard advantage over Bergdoll when the race was called off, the officials awarded him first money.

When the storm loomed up in the west there were still two events to run off—the twenty-five mile and the fifty-mile. It was decided to start the latter, as the field was rather large, it was the big race of the day, and it was thought that there would be sufficient time to finish it. Two Klines, a Buick, a Chalmers-Detroit and a Jackson were the other starters. The twenty-five mile event was not run.

Bergdoll was the star of the meet. The local millionaire brewer had his Benz going fine, and he easily annexed the five and ten-mile events for amateurs, besides finishing second in the fifty-mile free-for-all. Scoot Miller won one of the five-mile events for smaller cars in his Warren-Detroit, the other going to the Otto, driven by G. Jones. The times were slow throughout, the only record broken being the track figures for five miles, De Palma clipping 1 3-5 seconds off the previous best of 5.14 3-5. One event which proved amusing, even if not exciting, was the mile "nearest to three minutes" race. There were thirty entries, and the contest resembled a funeral procession, and an exceedingly slow one at that. Gordon Dyer, in his Selden, was the best guesser of the bunch, landing his car under the wire in 3.00 2-5.

A pursuit race with four entries was won by Burns' Autocar, after which came the big race—and the deluge, which set the 15,000 in attendance scampering like mad for shelter.



Start of the Fifty-Mile Event, Which Was Stopped by the Storm

The Quakers are much gratified over the announcement of the early granting of the sanction for the third annual renewal of their Fairmount Park classic, which is scheduled for Saturday, October 8. The mayor and city councils are much interested in the race, it having been borne in upon them that an event which can entertain a half million people for half a day has something in it of advertising value for the city which many other happenings upon which the municipality spends money do not possess.

An ordinance has been introduced into councils to appropriate a sum of money to add to the prize list and thus insure a representative entry list. The number of inquiries at this early date is an indication that these makers are beginning to recognize the claim of the Q. C. M. C. Contest Committee that the Fairmount Park race has become the big long-distance event of the year. The summaries:

Five miles, amateur—Division 1-C—

Car.	Driver.	Time.
1. Benz	E. R. Bergdoll	6.01 4-5
2. Alco	W. C. Longstreth	
3. Kline Kar	Harvey Ringler	

Five miles—Division 2-C—

1. Warren-Detroit	Scoot Miller	6.55
2. Schacht	Jas. H. Gray	
3. Black Crow	James Blind	

Five miles—Division 3-C—

1. Otto	George Jones	6.04
2. Mercer	W. Oliver	
3. Pullman	J. Adee	

Ten miles, amateur—Division 4-C—

1. Benz	E. R. Bergdoll	11.42 4-5
2. Buick	Bardsley	
3. Chalmers	Richards	

One mile, free-for-all, nearest 3 minutes—

1. Selden	Gordon Dyer	3.00 2-5
2. Alco	W. C. Longstreth	

***Fifty miles, free-for-all—**

1. Fiat	Ralph De Pa'ma	39.59
2. Benz	E. R. Bergdoll.	

Trial for five-mile track record—

1. Fiat	Ralph De Palma	5.13
2. Former record		5.14 2-5

*Race stopped at completion of thirty miles.

Georgia-Florida Good Roads Boost

The large illustration shows a sample of the roads the tourists found between Savannah and Jacksonville. The figures in the right lower corner are: A. J. Salinas, president of the Augusta Cotton Exchange; C. B. Garrett, president Augusta Automobile Club; Judge A. B. Moore, chairman Chatham County Board of Commissioners; F. C. Battey, president Savannah Automobile Club, and Judge Oliver T. Bacon—a bunch of "Good Roads Boosters."

SAVANNAH, GA., June 20—The recent convention of the Georgia Good Roads Federation and dual endurance run from Augusta and Jacksonville to this city was a pronounced success. The Augusta contingent, consisting of sixteen cars, was met nine miles out by half a hundred cars from the Savannah Automobile Club and escorted into the city. En route the travelers, after an early morning start, stopped for breakfast at Millen, where they were the guests of Mayor Daniel and the City Council.

From Millen the party continued until Statesboro was reached, where dinner was ready and served. The roads between these two cities were in poor shape. A delegation of good roadsters picked up at Millen included E. E. Chance, chairman of the County Commissioners; J. P. Palmer, superintendent of roads; J. L. Boyd, one of the County Commissioners, and G. F. Storey.

On reaching Savannah a parade was formed and something like ten thousand people watched the cars as they rolled down the beautiful Main street of Savannah and around part of the Grand Prize race course to the yacht club, where a big luncheon awaited them.

But twelve cars made the two-day trip from Jacksonville to this city. The reason given is because one of the largest and hottest elections ever held in the State was on. The start was made early in the morning and the cars traveled over the same course as that of the Savannah Automobile Club during the month of April. The night stop was made at Brunswick.

Between three and four hundred were in attendance at the third meeting of the Georgia Federation of Good Roads Authorities, of which the two runs were a feature. Besides delegates from each county in the State there were several repre-

sentatives from several counties in Florida and South Carolina. The following officers were elected: President, William F. Eve, of Augusta; secretary, J. C. Harper, Augusta; vice-president, W. H. Moore, Statesboro; N. F. Tift, Albany; F. Sheffield, Sumter County; R. H. Drake, of Griffin; W. M. Gammon, of Rome; W. S. Holma, of Athens. Albany was selected as the 1911 convention city.

Speeches were made by Mayor Tiedeman, who welcomed the visitors and extended them the freedom of Savannah; Judge William F. Eve, of Augusta; J. E. Pennybacker, expert from road department of the Department of Agriculture; F. H. Opper, an expert on road material; Prof. C. H. Strahan, of the Engineering Department of the University of Georgia, Athens; Frank F. Battey, of the Savannah Automobile Club, and Judge W. M. Gammon, of Rome.

After the convention the visitors were taken out to several of the county farms and shown how work progressed here with the convicts. At several of these places lunch was served and a trip around the twenty-five miles of the famous Grand Prize race course was taken. After this a trip was made to the Casino at Thunderbolt, where a banquet and speechmaking were in order.

The following cars made the trip from Jacksonville and Augusta:

JACKSONVILLE TO SAVANNAH

Car	H.P.	Entrant	Driver
Oldsmobile	40	Hugh Barnes	Hugh Barnes
Ford	20	L. C. Oliver	L. C. Oliver
Ford	20	H. B. Race	H. B. Race
Overland	30	Jax. Motor Co.	E. Roberts
Buick	40	H. C. Hare	H. C. Hare
Cadillac	30	O. S. Albeitton	O. S.Albeitton
Cadillac	30	P. A. Holt	J. T. Gore
Cadillac	30	F. J. Hyde, Jr.	F. J. Hyde, Jr.
Cadillac	30	Geo. F. Bensel	Geo. F. Bensel
Oldsmobile	40	M. D. Johnson	M. D. Johnson
Oldsmobile	40	D. H. McMillan	Miss B. McMillan
Hudson	20	F. M. Phillip	B. A. Coleman

AUGUSTA TO SAVANNAH

Rambler	45	C. B. Garrett	C. B. Garrett
Hupmobile	16	F. A. Wolfe	F. A. Wolfe
Brush	..	G. Speth	G. Speth
Ford	18	G. S. Lombard	R. Anderson
Ford	18	J. F. Doyle	J. F. Doyle
Pullman	30	B. S. Dunbar	B. S. Dunbar
Buick	30	A. Brill	A. Brill
Haynes	30	J. Cullum	J. Cullum
Haynes	30	R. Perkins	R. Perkins
Hupmobile	16	T. C. Vason	T. C. Vason
Elmore	36	M. Walton	M. Walton
Overland	30	J. A. Gaston	J. A. Gaston
Franklin	..	H. H. Alexander	H. H. Alexander
Ford	18	E. E. Chance	E. E. Chance
Maxwell	30	Speth Bros.	J. O. Applenhite
Falcar	35	F. Perroux	F. Perroux

Testing Steel—For Impact, Bending, Etc.*

(First Installment)

This paper presents, in a most capable way, an exposé of the methods employed and conclusions reached in two previous papers on this subject. In the two earlier papers it is pointed out that, while notched-bar testing has its value, it also has the hidden misfortune of casting reflections on good material. The authors employ some of the latest methods of determining the values they set out to fix, and the paper presents an exhaustive treatise on the subject from the several points of view.

INTRODUCTORY—The general impression conveyed by the two papers† on Impact Testing of Steel, read in November, 1908, before this institution by Dr. Stanton and by Mr. Harbord,** was that, with notched test-pieces broken at one blow, the results were too erratic to be of real practical value except in special cases. This was contested at the time and there were some expressions of opinion that tensile-impact tests, on unnotched bars, were in many ways preferable; it appeared, therefore, desirable to examine the matter more in detail. It is undoubted that a notched-bar impact test will discover any inferior material, for in this case all the impact figures will be low. But it is also quite possible that good material may be condemned when only a single test is made, should it happen that this test-piece gave an abnormally low result. To take the average of a large number of test-pieces is not satisfactory, because the element of doubt remains whether the disparities are due to want of uniformity in the material itself or to errors in the measurements. The view, as expressed in those two papers, would appear to be that the measurements were at fault, but there is other evidence that the microstructure of the material is in reality the main cause.‡ It is to be observed that in a notched bar, ruptured at one blow by cross-breaking, it is the material at the bottom of the notch that has to bear the brunt of the impact, and it has not time to receive support from the bulk of the material. Should the microstructure, or it may be the macrostructure, at the bottom of the notch be weak, a low impact figure will be obtained. In actual use in a piece of mechanism, however, where anything in the nature of a notch is avoided so far as the design will admit, the contiguous portions of the material assist each other, and therefore weaknesses of the order of magnitude of the microstructure or even of the macrostructure are more or less obliterated by the stronger portions.

Following this argument, it would appear that, for an impact test to be of practical value, it ought to bring the whole of the material, in the cross-section under observation, simultaneously under the influence of the impact stress. A one-blow tensile-impact test on an unnotched test-piece fulfills this condition, and it is to be observed that M. Pierre Breuil, after collating a large number of the published results of various methods of impact testing and adding thereto many of his own, has come to the same conclusion.§

In the discussion on Dr. Stanton's and Mr. Harbord's papers Mr. Bertram Blount referred to a tensile-impact testing machine devised with the assistance of Mr. Hurry—to whom the idea was largely due—and an abstract of some of the preliminary results were given. It was decided to continue these experiments on a larger and more comprehensive scale and compare the results obtained with the usual static tensile tests.

On reviewing the matter, however, it was thought that the height of drop available, namely 6 feet, with this machine was insufficient, and that therefore the machine should be re-designed so as to admit of a drop of about 30 or even 40 feet, so as to obtain a striking velocity of 40 to 50 feet per second. By the foresight of the late Mr. David Kirkaldy, trap doors had been provided on the various floors of his testing works to accommodate a falling-weight apparatus, and owing to the facilities thus afforded the new machine was readily installed on the removal of the original one.

The new apparatus was designed upon the following principles, as distinct from the previous apparatus. The fall was to be a free fall, entirely independent of any sliding upon guides. The specimen was to move with the weight so as to avoid the complications arising when a tup is allowed to fall upon a stationary cradle, wherein the specimen is held, as the effects of inertia have then to be allowed for.

The machine being of the one-blow type, the only energy measurement required was the determination of the energy

* Paper read before the Institution of Mechanical Engineers (Great Britain) May 27, 1910. Presented by Bertram Blount, W. G. Kirkaldy, Member, and Capt H. Riall Sankey, R.E. (ret.), Member of Council.

† "The Resistance of Materials to Impact," by Dr. T. E. Stanton, D.Sc., and Mr. L. Bairstow. Proceedings 1908, Part 4, page 889.

** "Different Methods of Impact-Testing on Notched Bars," by Mr. F. W. Harbord. Proceedings 1908, Part 4, page 921.

‡ Proceedings, 1904, pages 1251 and 1254.

§ "Revue de Mécanique," 1908, page 537.

remaining in the tup immediately after rupture of the specimen. There are many ways of measuring this energy, such as receiving the tup upon a spring and observing the amount by which the spring is shortened, or compressing air in a cylinder and determining the increase of pressure.

The former method has been adopted in similar impact-tensile machines, and the latter appeared promising, but after much discussion it was decided, at the suggestion of Mr. W. J. Marshall, A.I.Mech.E., to measure the actual velocity of the tup just after the moment of fracture of the test-piece, by observing the time-interval between the breaking of electric contacts at known distances apart. It is, of course, easy to deduce the energy remaining in the tup after fracture so soon as this velocity is known. The actual apparatus will be described later.

In order that these impact tests should have as great a practical value as possible they were made with a considerable number of the types of steels used in mechanical engineering. The original machine was designed to break test-pieces 1-4-inch diameter, and this diameter had been adopted and all the test-pieces machined accordingly before the new machine was designed. It was, however, decided later to make another series of tests with specimens 0.357-inch diameter to take advantage of the greater capacity of the new machine; the effective length for extension was 2 inches. The ordinary tensile tests were carried out, not only with test-pieces of standard size, but also with smaller test-pieces of the same size as the impact-tensile test-pieces, namely, 0.357-inch diameter. A full chemical analysis was also made. In this way it was possible to establish a comparison of the tensile impact tests with the usual methods of determining the characteristics of steel. A further comparison was also established by making a series of tests with a repeated-bending machine of the type described by Captain Sankey in the discussion on Mr. Harbord's paper, and on which further particulars are given later.

In every case the material was tested exactly as received from the manufacturers; that is to say, in the condition in which it would be actually sent out for use. It is considered that this is a matter of great importance because the mechanical characteristics of steel are affected by heat and other treatments.

Types of Steel Tested.—The authors gratefully acknowledge that, by the intermediary of the secretary of the Engineering Standards Committee, a number of makers were good enough to supply the various types of steel tested in accordance with the British Standard specification of each type; with one exception, however, namely the steel suitable for motor-car crankshafts, etc., which was purchased.

Refinements in Point of Detail for 1911

ONE of the principal causes of accidents to automobile drivers and owners is due to starting with the gears in mesh, someone having possibly meddled with the levers, placing one of them in mesh while the owner or driver was away. A lock which would dispense with this trouble would also reduce the number of cars stolen, for if it would prevent shifting of the levers, it would render the car inoperative.

A lock of this character has been designed and placed on the market by a Detroit concern, the Auto Sure Lock Company, which has not alone these salient points of merit, but also is simple and very low in price.

This device is called the Sure Lock, and although the first one to be brought out was designed for Cadillac cars, and especially fits that make, the lock is suitable for any make of car having a similar gear-shifting quadrant. Others are being brought out for other makes of cars, having a different quadrant. Such is the merit of the little device that the Cadillac Motor Car Company has taken it up and listed it in their catalogues as an extra.

The device consists of a brass plug, with a lock attached to the upper end by a strong chain, while the lower end of the plug carries a lug or ear with a hole for the lock to go through. The padlock is of the Corbin make, and two keys are supplied. In size, the whole thing is small enough to be conveniently carried in the side pocket of one's coat.

Fig. 1—Showing application of lock to the side lever which makes the car thief-proof

In the upper end of the plug there is milled a notch, just the size of the hand lever at the level of the top of the quadrant. One of the sides of the plug carries down in a long extension, which is both wide and thick—so wide and thick, in fact, as to take up the space in the shifting fork that the hand lever takes up when shifted over, making it possible to shift the lever to that side. Similarly the hand lever might be shifted over to the other side, but the long extension would then come directly in line with the stationary bars of the quadrant, and thus prevent any forward or backward motion. The hand lever is thus to all intents and purposes not movable, without unlocking the padlock, removing it, and then removing the brass plug. The latter may not be removed without unlocking the padlock, on account of the size and shape of both the shifting fork and the extension of the brass plug, designed for this purpose.

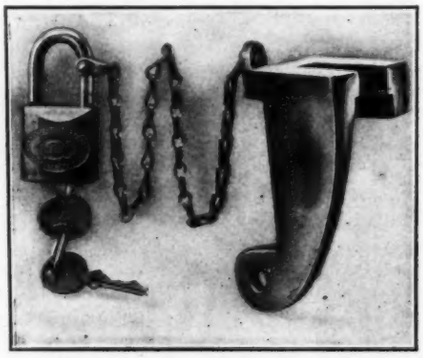


Fig. 2—The lock and the parts that go with it before applied to the side lever

While probably not appealing to people of small towns and the country, this device is practically a necessity for city use, and by reason of its low price and inherent simplicity, should soon have a great vogue there. The peace of mind and protection of knowing that one's car is perfectly safe, through a thoroughly good preventive device rather than something on the cure-afterward order, should make for wide sales. As stated, the company is working on a number of other models, and soon one will be able to secure a Sure Lock for any make of car.

1911 Ideas for Preventing the Growth of Noise

The question of how long an automobile will last has received some attention at the hands of users, and to some extent the purchasing of successive models year after year has been due to the fact that while the old automobiles were capable of

running, they nevertheless offered food for serious reflection because they became noisy. This together with the rate of speed at which bodies went out of style represent the two serious matters which will have to be dealt with in the long run, but it is gratifying to note that the progressive makers of cars are not awaiting the decision of the buying public. Fig. 4 is offered to illustrate the new trend. This is taken from the new "Silent Six" Matheson, and shows grease cups G1 and G2 in a get-at-able position outside of the chassis frame. These cups feed grease to the bearings of the shafts which support the clutch and brake pedals. In the earlier types of automobiles, designers labored under the impression that the bearings of parts which did not rotate were not entitled to their serious consideration. They are slowly learning, however, that there is something more than the mere question of the incidental operation of an automobile. The considerable number of small bearings scattered around the chassis, even though they may not have to withstand the rack due to rotation and high pressure, do, nevertheless, become the sources of unbearable noise unless the bearings are sealed by grease so that dust cannot enter, and serve as an abrasive substance introducing excessive "shake" and its companion, noise. It takes quite a number of these grease cups to properly care for all the non-rotating small bearings in a car, but it is almost a waste of time and cost to introduce them, unless care is exercised to so locate them that an autoist, even though he may not be familiar with the inner intricacies of the mechanism, will be able to observe by a superficial inspection that they are present, in which event his good sense will permit him to inquire as to the reason for their presence, and if they are accessible, he will be inclined to give them the care and attention which are in keeping with the great importance of this part of the automobile subject.

Fig. 3—Illustrating the method of applying the parts in assembling

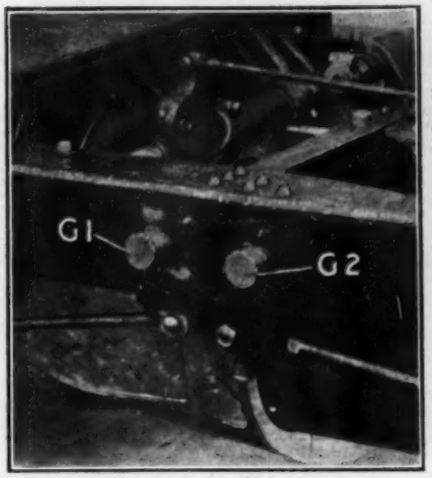


Fig. 4—Part of the Matheson "Silent Six" showing an application of grease cups

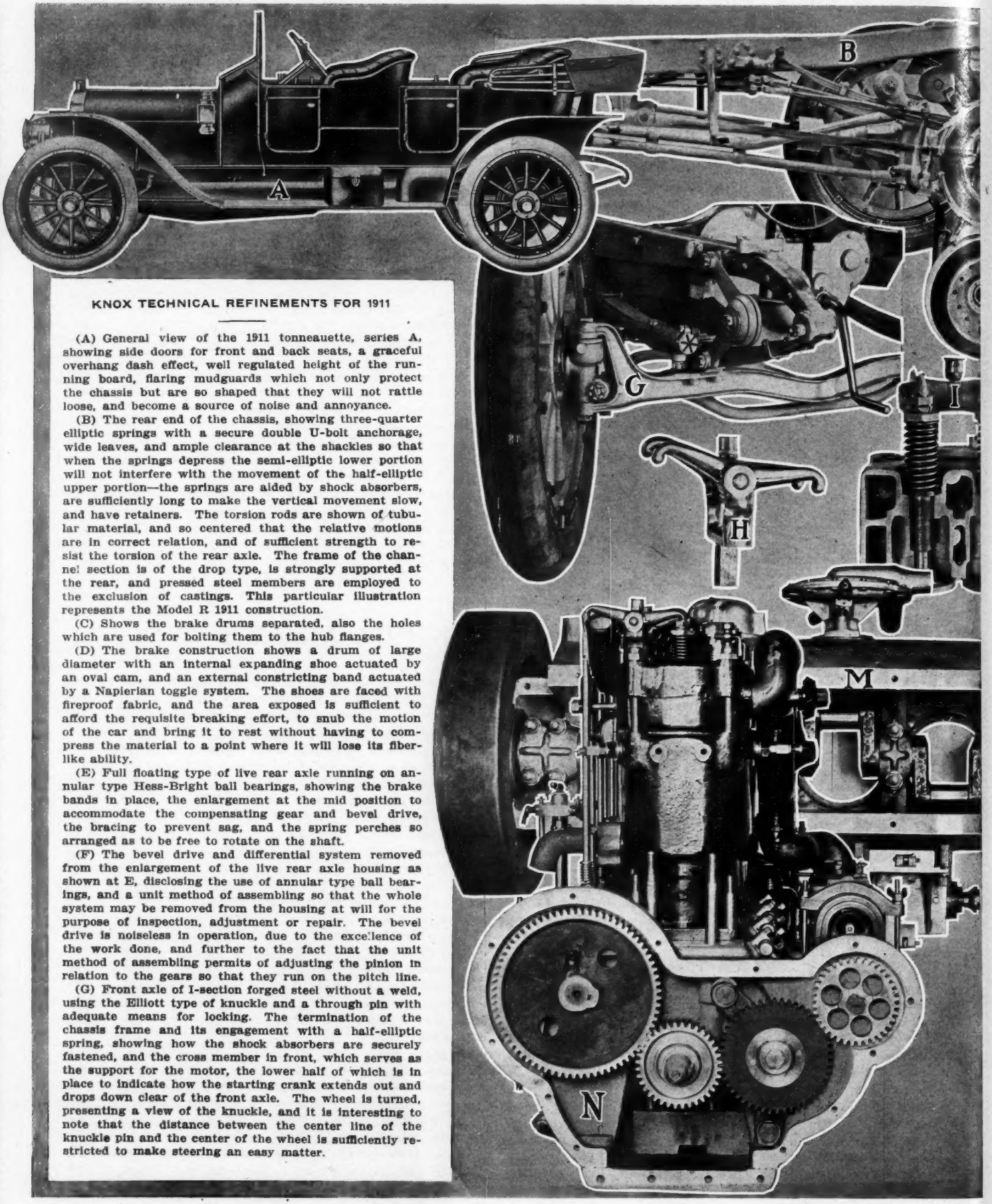
To the autoist who wishes to get good service out of his car, without having to pay too much by way of cost of maintenance, it is not too much to state that empty grease cups offer no possible advantage; it is necessary to keep them constantly filled with grease.

Knox Comes Out with 1911 Models

THE discontinuance by leading firms of American automobile makers of the custom of turning out yearly models is an indication that the industry is approaching that acme of perfection in design and construction which is the goal of all who strive to excel. The Knox Automobile Company, of Springfield, Mass., for instance, has approached so near perfection in general construction that it has decided to abandon yearly models, preferring to incorporate and put on its cars any slight changes or meritorious features as soon as they have been approved by the experimental and testing departments. This innovation will doubtless prove of decided benefit to Knox owners, agents and customers, present and future, as it insures a continuance of the general features of the various models for years to come. In Knox cars, indeed, are incorporated the same general construction features that have been so pronounced since the introduction of the water-cooled types in 1907. The original ideas have been developed entirely in the engineering department, under the supervision of Herman G. Farr. The steady advancement of the Knox product is due to conservatism in working out details of construction and careful consideration of even the slightest changes before they are adopted.

Torpedo fronts will be a feature of 1911 Knox body types except the closed cars, all bodies being made from steel and aluminum over wood frames and designed and built in the company's body works. They include five- and seven-passenger touring cars with torpedo-type front, five-passenger tonneauettes, raceabouts and regular torpedo types, all made with flush sides, except that the touring car tonneaus widen out back of the rear doors, as do also the tonneauettes, the tonneaus of which are made detachable. The different types of 1911 models will be designated by series, the classes to be known as Model R, four-cylinder, 40-horsepower, and the Model S, six-cylinder, 60-horsepower, as in 1910. Comparison of the 1911 models with those of last year brings to light a few minor changes in construction, among which may be mentioned the lengthening of the Model R wheelbase to 121 1-2 inches, and the placing of the front axle 1 1-2 inches farther forward than in the 1910 design. The rear springs are lengthened to 58 inches over-all, and 5 inches have been added to the length of the top half, or scroll, improving the good riding qualities. Rear axles are Knox full floating type, running on Hess-Bright annular ball bearings. The entire differential is easily dismounted if necessary. Torsion rods will be used on full floating axles. Frames are made of heavy-gauge nickel steel with deep side channels and wide flanges. A slight change has also been made in the 1911 transmission, due to the use of double annular bearings at the rear of the transmission and also in the rear bearing of the lay shaft—both these changes making for quieter running on the intermediate and low gears. A change in the front timing gear is the adoption of a cast-iron magneto idle gear in place of that of fiber used in the 1910 models. There has also been a change of price, the 1911 Model R being quoted at $3,300 instead of $3,250, the prices of the Model S series remaining unaltered.

The Knox power plants for 1911 will retain all of the features that have made them so satisfactory and successful ever since the water-cooled motors were adopted—i. e., unit construction and three-point suspension; valves in the heads, with detachable heads; force-feed system of lubrication; side arms of the yoke are detachable and bolted to the sides of the crankcase at the rear, and with the transmission case forming the rear of the yoke. An exceptionally wide flat-tube radiator is used on both models, thus avoiding overheating.



KNOX TECHNICAL REFINEMENTS FOR 1911

(A) General view of the 1911 tonneauette, series A, showing side doors for front and back seats, a graceful overhang dash effect, well regulated height of the running board, flaring mudguards which not only protect the chassis but are so shaped that they will not rattle loose, and become a source of noise and annoyance.

(B) The rear end of the chassis, showing three-quarter elliptic springs with a secure double U-bolt anchorage, wide leaves, and ample clearance at the shackles so that when the springs depress the semi-elliptic lower portion will not interfere with the movement of the half-elliptic upper portion—the springs are aided by shock absorbers, are sufficiently long to make the vertical movement slow, and have retainers. The torsion rods are shown of tubular material, and so centered that the relative motions are in correct relation, and of sufficient strength to resist the torsion of the rear axle. The frame of the channel section is of the drop type, is strongly supported at the rear, and pressed steel members are employed to the exclusion of castings. This particular illustration represents the Model R 1911 construction.

(C) Shows the brake drums separated, also the holes which are used for bolting them to the hub flanges.

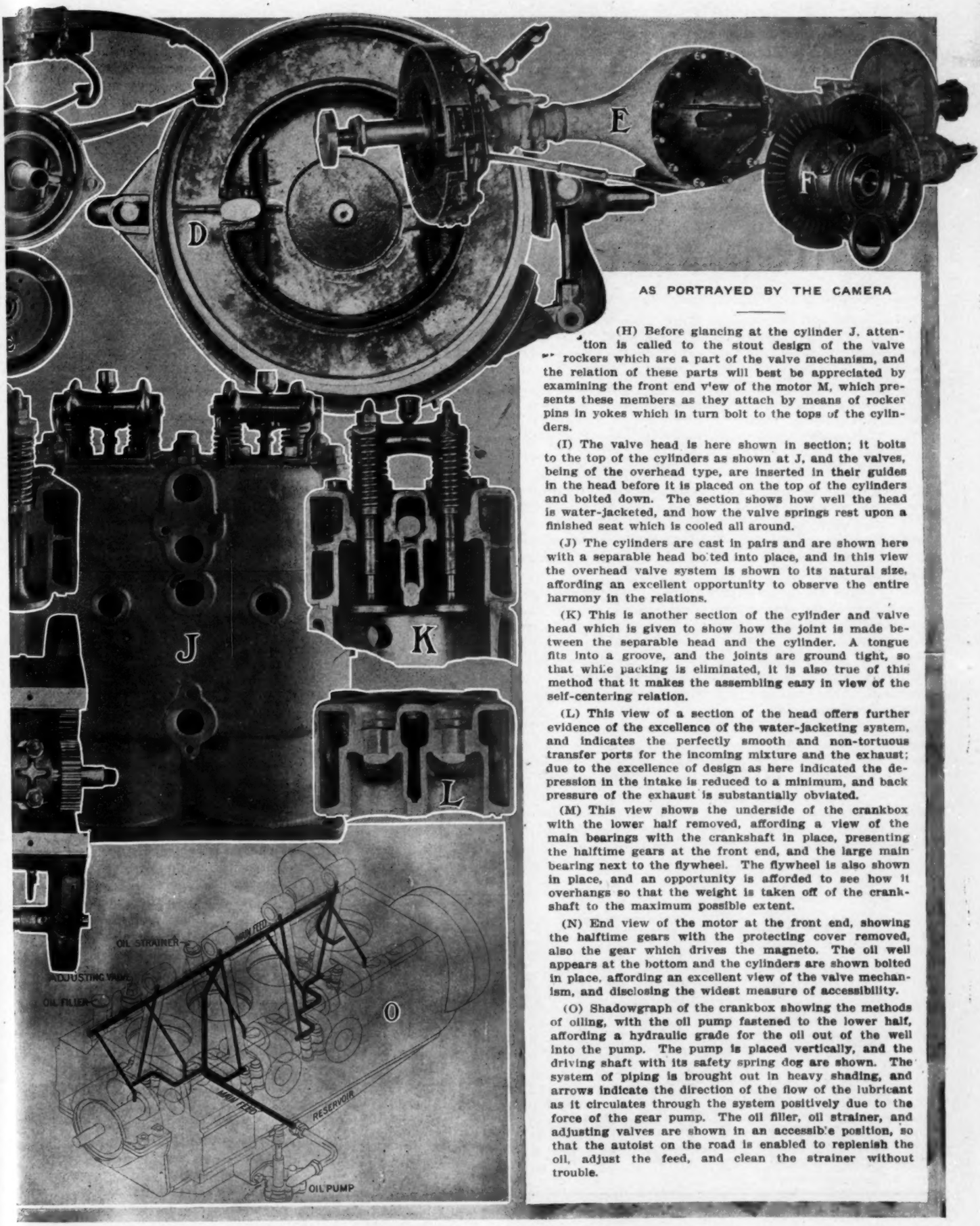
(D) The brake construction shows a drum of large diameter with an internal expanding shoe actuated by an oval cam, and an external constricting band actuated by a Napierian toggle system. The shoes are faced with fireproof fabric, and the area exposed is sufficient to afford the requisite breaking effort, to snub the motion of the car and bring it to rest without having to compress the material to a point where it will lose its fiber-like ability.

(E) Full floating type of live rear axle running on annular type Hess-Bright ball bearings, showing the brake bands in place, the enlargement at the mid position to accommodate the compensating gear and bevel drive, the bracing to prevent sag, and the spring perches so arranged as to be free to rotate on the shaft.

(F) The bevel drive and differential system removed from the enlargement of the live rear axle housing as shown at E, disclosing the use of annular type ball bearings, and a unit method of assembling so that the whole system may be removed from the housing at will for the purpose of inspection, adjustment or repair. The bevel drive is noiseless in operation, due to the excellence of the work done, and further to the fact that the unit method of assembling permits of adjusting the pinion in relation to the gears so that they run on the pitch line.

(G) Front axle of I-section forged steel without a weld, using the Elliott type of knuckle and a through pin with adequate means for locking. The termination of the chassis frame and its engagement with a half-elliptic spring, showing how the shock absorbers are securely fastened, and the cross member in front, which serves as the support for the motor, the lower half of which is in place to indicate how the starting crank extends out and drops down clear of the front axle. The wheel is turned, presenting a view of the knuckle, and it is interesting to note that the distance between the center line of the knuckle pin and the center of the wheel is sufficiently restricted to make steering an easy matter.

DEPICTING THE MECHANICAL NICETIES OF THE KNOX 1911



AUTOMOBILES AND SHOWING THE RELATIONS OF THE UNITS

AS PORTRAYED BY THE CAMERA

(H) Before glancing at the cylinder J, attention is called to the stout design of the valve rockers which are a part of the valve mechanism, and the relation of these parts will best be appreciated by examining the front end view of the motor M, which presents these members as they attach by means of rocker pins in yokes which in turn bolt to the tops of the cylinders.

(I) The valve head is here shown in section; it bolts to the top of the cylinders as shown at J, and the valves, being of the overhead type, are inserted in their guides in the head before it is placed on the top of the cylinders and bolted down. The section shows how well the head is water-jacketed, and how the valve springs rest upon a finished seat which is cooled all around.

(J) The cylinders are cast in pairs and are shown here with a separable head bolted into place, and in this view the overhead valve system is shown to its natural size, affording an excellent opportunity to observe the entire harmony in the relations.

(K) This is another section of the cylinder and valve head which is given to show how the joint is made between the separable head and the cylinder. A tongue fits into a groove, and the joints are ground tight, so that white packing is eliminated, it is also true of this method that it makes the assembling easy in view of the self-centering relation.

(L) This view of a section of the head offers further evidence of the excellence of the water-jacketing system, and indicates the perfectly smooth and non-tortuous transfer ports for the incoming mixture and the exhaust; due to the excellence of design as here indicated the depression in the intake is reduced to a minimum, and back pressure of the exhaust is substantially obviated.

(M) This view shows the underside of the crankbox with the lower half removed, affording a view of the main bearings with the crankshaft in place, presenting the halftime gears at the front end, and the large main bearing next to the flywheel. The flywheel is also shown in place, and an opportunity is afforded to see how it overhangs so that the weight is taken off of the crankshaft to the maximum possible extent.

(N) End view of the motor at the front end, showing the halftime gears with the protecting cover removed, also the gear which drives the magneto. The oil well appears at the bottom and the cylinders are shown bolted in place, affording an excellent view of the valve mechanism, and disclosing the widest measure of accessibility.

(O) Shadowgraph of the crankbox showing the methods of oiling, with the oil pump fastened to the lower half, affording a hydraulic grade for the oil out of the well into the pump. The pump is placed vertically, and the driving shaft with its safety spring dog are shown. The system of piping is brought out in heavy shading, and arrows indicate the direction of the flow of the lubricant as it circulates through the system positively due to the force of the gear pump. The oil filler, oil strainer, and adjusting valves are shown in an accessible position, so that the autoist on the road is enabled to replenish the oil, adjust the feed, and clean the strainer without trouble.

The selling prices include full car equipment, as in 1910, including top, glass front, speedometer and clock, shock absorbers, baggage rack, Prest-O-Lite, nickel or brass trimmings, combination oil and electric side lights and tail light, Fiske demountable rims, tire cover, tire iron, horn, tire outfit and set of tools.

The prices for Knox cars for 1911 will remain practically unchanged, the Model R touring car with regular body being now listed at $3,300 instead of $3,250, the price of last year's model. In the Model S six-cylinder the touring car sells for $5,000 with front seat doors, and the limousine at $6,000. The other types are listed as follows: Close-coupled with front seat doors, $4,900; tonneauette with detachable tonneau, $4,900; torpedo type, six passengers, $5,000; double rumble raceabout, $4,800; standard 106-inch wheelbase raceabout or runabout, $4,700.

In the Model R, besides the touring car at $3,300, there are the tonneauette with regular front, $3,250; tonneauette with torpedo front and high doors, $3,350; close-coupled type, $3,250; torpedo type, $3,400; double rumble raceabout with torpedo front, $3,300; standard raceabout, 104-inch wheelbase, $3,200; seven-passenger limousine, $4,250; special folding landaulet, six-passenger, $4,250.

Fisk bolted-on tires with detachable rims will be the regular Knox equipment for 1911, 36 x 4 1-2 for Model R and 38 x 5 1-2 for Model S. In the raceabouts the purchaser will be given the option of 34 or 36-inch wheels.

How the Cadillac "Thirty" Is Made

PRICEWISE this car sells for $1,600. The standard equipment as given in the specifications is included. The remaining important matters, which are here to be discussed, involve the methods of manufacture and the details of design. In order to give the reader a capable insight into the details of design of the car, working drawings were reproduced by the wax process and are here given as follows:

Fig. 1.—Assembly of the clutch showing a section of the flywheel, the truncated cone member, and the clutch, which is made of pressed steel, also the sleeve, clutch spring, method of adjusting the spring tension, ball bearings for taking thrusts, and the control mechanism with a distance rod which fixes the relations with a view to preventing lost motion, which distance rod extends from an eye in the end of the trunnion fork to its anchorage on a lug which extends down from the front end of the transmission gear case.

Fig. 2 shows the motor in part section, longitudinally, and a cross-section of the same cutting through one of the cylinders, exposing a section of the piston, also the connecting rod, and giving relations of the half-time gears, besides indicating how lubricant is stored in a well in the bottom of the case. The longitudinal section, in addition to showing the flanging of the lower half of the crankbox, also affords details of the methods employed for driving the fan in front, and presents the section detail of the fastening of the copper water-jacket to the cast gray-iron cylinder, which is an important innovation in Cadillac work. The camshaft is also shown in part, being cut away at the front end, which does not prevent indicating the method of engagement of the valve lift through a roller which rides on the cam, and the means of adjustment which are necessary for the proper timing of the motor. The cylinders, according to this construction, are machined on the inside and outside, so that any imperfections which may be concealed under the skin as the cylinders come from the foundry are bound to be discovered. It is also a feature of this type of cylinder construction that the cooling will be much more efficacious, due to the fact that the heat transfer is on a more efficient basis, it being well understood that the heat conductivity of the hard skin on the surface of a casting is not nearly up to the level of that which obtains for the section of the metal under the skin.

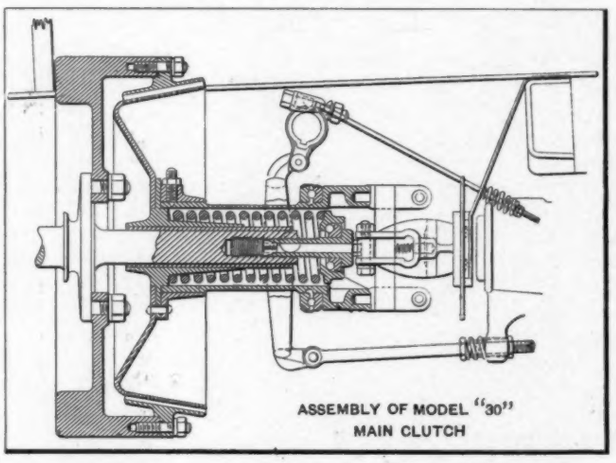


Fig. 1

Fig. 3.—Cross-section of the steering gear, which is of the worm-and-sector type, with ball thrust bearings at the extremities of the worm, with a grease-tight housing, and a ratchet on the sector shaft, which is there placed for the purpose of adjusting the worm and sector, with a view to the elimination of lost motion. The designer recognized the futility of providing an adjustment of this sort in the absence of some means for compensating for wear, and this important detail, by way of compensation, is accomplished in a very simple manner. The pitch line of the sector is not to unit radius. In other words, the sector is so shaped that as wear creeps in the eccentric bearings may be adjusted so that the sector will travel toward the worm, and the differences due to wear are

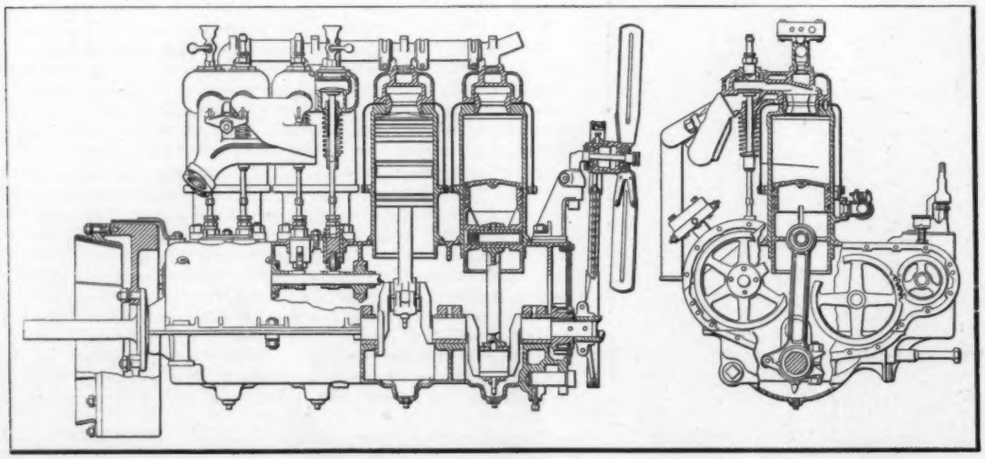


Fig. 2

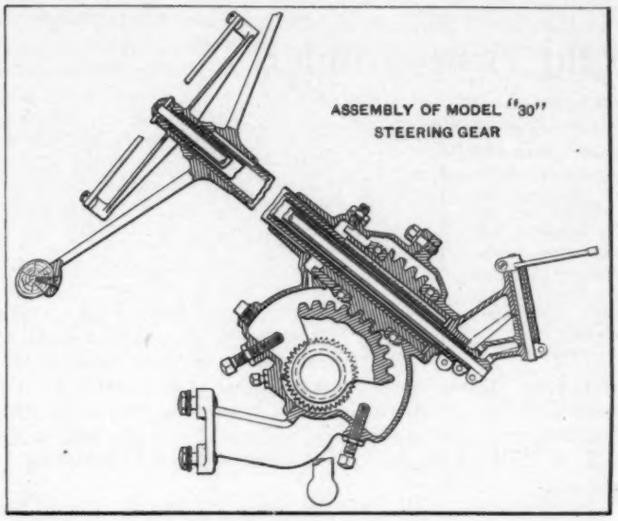


Fig. 3

neglected with impunity. In other respects, the steering gear is substantially made with provision for the spark and throttle control on the top of the wheel, and a lever system at the lower end, which transmits the motions of the spark and throttle lever for their intended purpose. The method of anchoring the steering-gear housing to a lateral of the chassis frame includes a stout arm integral with the housing, and a crow-foot on the extremity, which is faced off to make a good bearing, so that the holding bolts which pass through the lateral of the chassis frame are enabled to do their proper work. The steering wheel is of large diameter, with a substantial metal portion, and it is accurately fitted to the tube, and properly keyed, so that the autoist is introduced to neatness, comfort, and safety when he takes the wheel in this car.

Fig. 4 presents the transmission gear in section, the universal joints of the protruding shafts, also a section of one of the universal joints and a section of the selector. Glancing at the section of the transmission gear, it will be observed that it is of the three-speed selective type, that the gears are wide-faced, of symmetrical design, and are secured to the shafts (a) by riveting to integral flanges on the lay shaft, and (b) the sliding gears are accurately fitted to a square shaft. The shafts are of unusual diameter, and relatively short, so that they possess to a degree the measure of rigidity which aborts deformations. It is scarcely necessary to point out that in many of the older designs of automobiles this question of rigidity was neglected, the shafts were made long and relatively small in diameter, they deflected under the load, and the gears declined to slide. The universal joints are fetched up on a slow taper, so that with the pressure, which is exerted by the locking nuts, they are in sufficiently secure relation to transmit the torque of the motor even in the absence of keys, but with a view to proper insurance, a well-fitted key is used in each case.

Every effort is made in the manufacture of the units, as well as in the automobile complete, to have absolute interchangeability of parts, and the facilities afforded in the Cadillac plant are of a studied character, it being appreciated that this end cannot be secured unless the personal equation is eliminated.

SPECIFICATIONS OF THE CADILLAC "THIRTY"

Motor—Four-cylinder, four-cycle; cylinders cast singly; 4¼ inch bore by 4½ inch stroke. Five-bearing crank shaft.
Horsepower—Nominal 30. Actual, dynamometer tests, 33.
Cooling—Water. Copper jacketed cylinders, gear driven gear pump. Radiator of ample efficiency. Fan attached to motor, running on two point ball bearings. Center distances of fan pulleys adjustable to take up stretch in belt.
Ignition—Two new systems, complete and independent—low tension magneto; four unit coil with dry cells.
Lubrication—Automatic splash system, oil uniformly distributed. Supply maintained by mechanical force feed lubricator with positive sight feed on dash.
Carbureter—Float feed type.
Clutch—Cone type, leather faced, with special spring ring in fly wheel.
Transmission—Sliding gear, selective type, three speeds forward and reverse.
Drive—Direct shaft drive in housing to bevel gears of special cut teeth to afford maximum strength. Universal joint. enclosed in housing and running in oil bath.
Axles—Rear, special alloy steel live axle shafts running on special roller and ball bearings. Front, "I" beam section with drop forged yokes, spring perches, tie rod ends and steering spindles, the latter having ball thrust bearings.
Brakes—One internal and one external brake direct on wheels, large drums, double acting and compensating.
Steering Gear—Worm-and-sector type, adjustable, with ball thrust bearings.
Frame—Dropped, pressed steel, channel section. Width, 30 inches in front, 33 inches in rear.
Wheels—Wood, artillery type, with quick detachable rims. Special large hub flanges and special strength wide spokes.
Wheel Base—110 inches.
Tires—34 x 4 inches.
Tread—56 inches.
Springs—Front, semi-elliptical, 36 inches long by 2 inches wide. Rear, three-quarter platform; sides, 42 inches long by 2 inches wide; rear, 38 inches long by 2 inches wide.
Control—Spark and throttle levers at steering wheel. Steering wheel 17 inches in diameter. Clutch operated by foot pedal. Service brake (external) operated by foot lever. Emergency brake (internal) operated by hand lever. Speed changes by hand lever operating in "H" plate. Throttle acceleration by foot lever.
Speed—5 to 50 miles an hour on high gear.
Gasoline Capacity—About 13 gallons.
Oil Capacity—Six pints. Sufficient for 400 to 500 miles.
Upholstering—Black leather over genuine curled hair and deep coil seat springs.
Finish—Royal blue body and chassis striped.
Equipment—One pair gas lamps and generator; one pair side oil lamps and tail lamp, magneto, horn, set of tools, pump, tire repair kit, robe rail and tire irons.

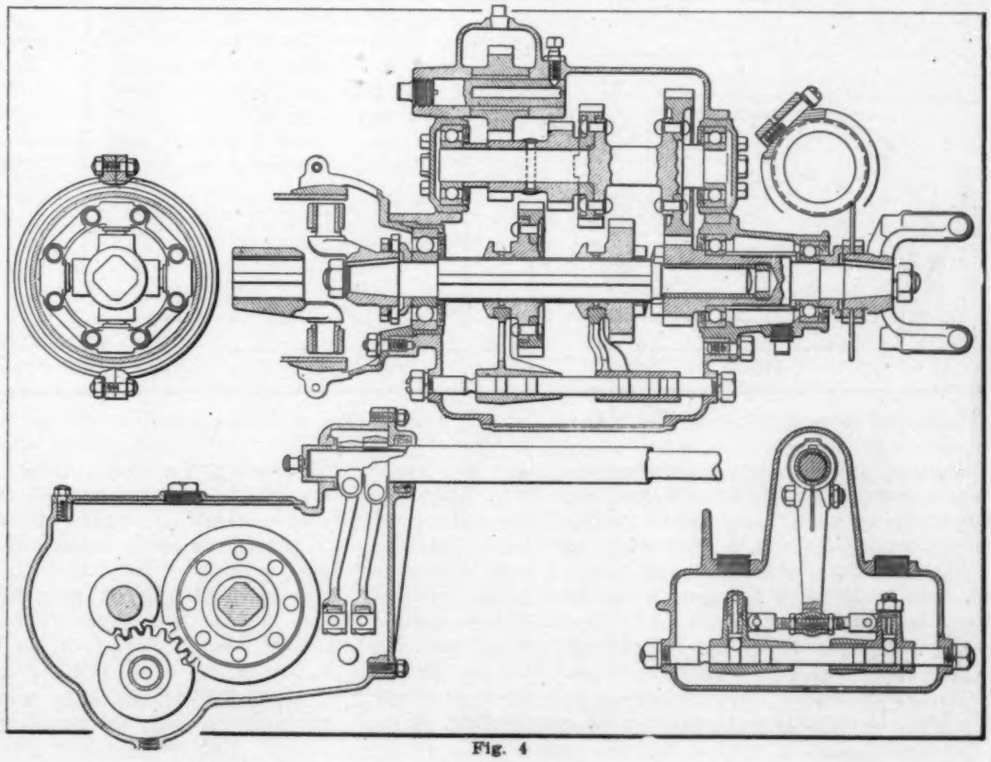


Fig. 4

Rejuvenating the Old Automobile

By J. B. MERCER.

Illustrating a modern fore-door type of body as it would appear on a Cadillac "Thirty" touring car, giving all the information required by a body maker, and showing how the body will appear when made. A means is afforded for clearing the side levers, and the material specifications are given in sufficient details to serve the end.

GENERALLY speaking, the process to be employed in the construction of a new fore-door type of body for the Cadillac "30" touring car is a mere repetition of the process which was laid down in THE AUTOMOBILE of June 16 for the rejuvenation of a Franklin Model H car. Barring the necessary changes in dimensions, and making sure that the new body will present an artistic appearance when completed, there is little else by way of skill which cannot be furnished by a body maker or a reasonably well-equipped repair plant upon demand.

In this case, the panel and moulding effect with the left side door, and the bent wood pillar to form the doorway, are identical with that of the process set down for the Franklin Model H, in which the framing is of wood, and sheet aluminum construction is employed, utilizing steel angle pieces and castings, to a certain extent, to strengthen the framing and brace the structure. In this example, Figs. 6, 7, and 8 show the side, front, and top elevations respectively, and the side levers are bent, as indicated in Fig. 7, so that they both fall outside of the body, whereas in the Franklin Model H the speed lever passed to the inside of the body through a slit. In the Cadillac model it is inexpedient to bend the levers so that they will fall inside of the body, due to the height of the quadrant, and the distance from the quadrant to the chassis frame. This specification calls for a new dash, which should be made to conform to the general finish of the doors and trim of the body throughout.

The pillars making the framing around the door are of bent ash in one piece, extending from the top line of the seat all the way around; fastening is provided for at the curve of the seat, and outer surface is finished so that it is in the plane of the seat panel. To prevent the joints from showing in the finished work the moulding is placed on the seat sufficiently offset to provide a good joint. Below the seat line, the pillar is fitted back onto the under body for a distance, as shown, it being the idea to have the moulding run along the edge of the panel, from the dash to the seat, so that it will come in line with the vertical moulding of the seat.

The pillar forms an offset, measuring from the side of the body, equal to the offset distance of the seat at its point of contact with the same, and, as in the Model H Franklin, the dash in front is brought out to the same line. The fastenings of the pillar to the body are by means of screws which pass through the panel and into the body framing. The new dash should be 3-4 of an inch thick material, which may be of white pine, if the cost is to be kept down, and of Mexican mahogany, if first-rate work is wanted. The lock-post is framed into the pillar at the bottom, and to the side rail at the top; the surfaces of the sides and the doors should be covered with No. 16-gauge aluminum, fastened under the moulding at the top, to the curvature

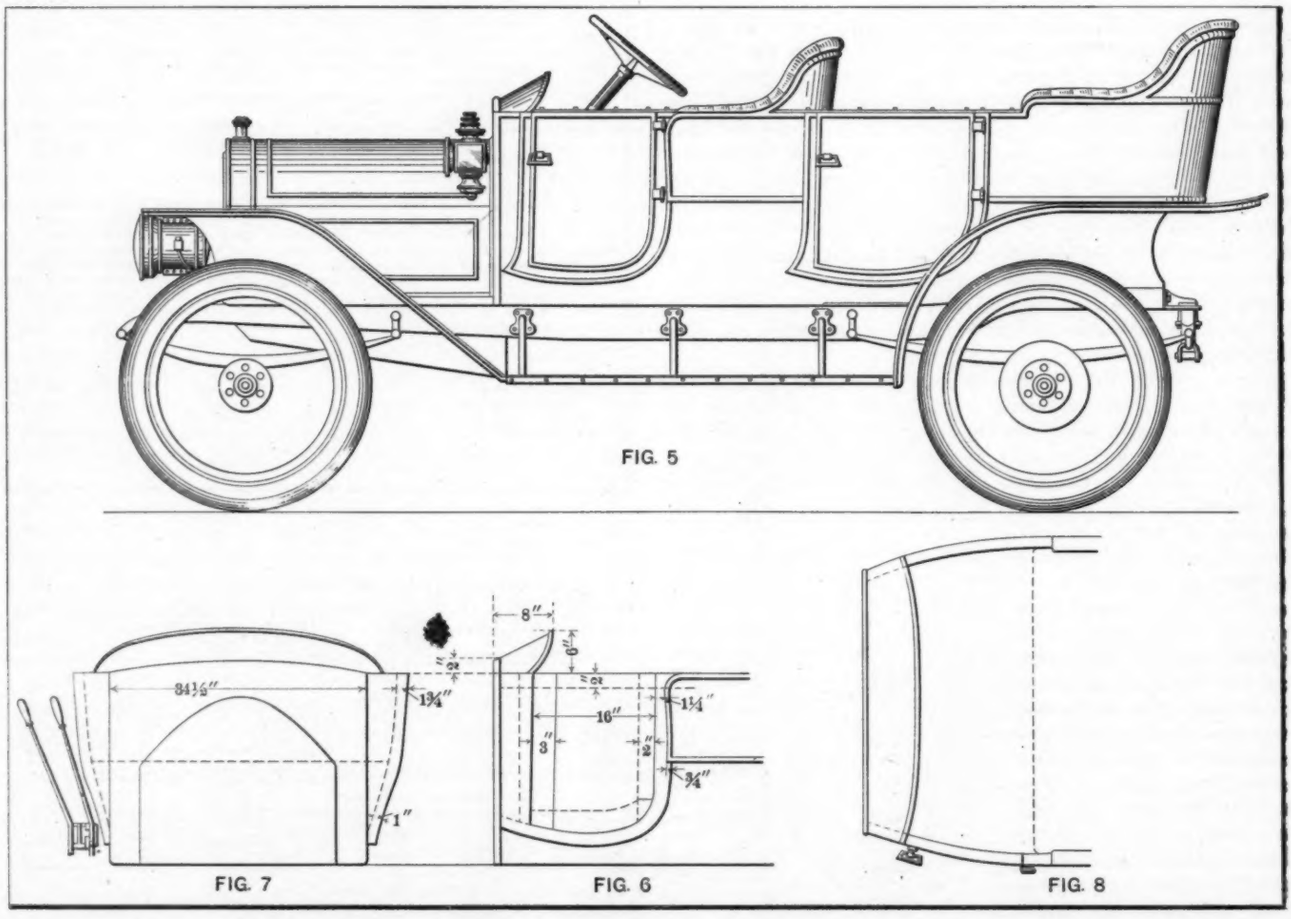


Fig. 5—Side elevation fore-door type body for Cadillac "Thirty." Fig. 6—Details of fore-doors. Fig. 7—Front View. Fig. 8—Plan

of the dash and to the outer edge of the pillars; it should be turned in around the doorway, and at the joints around the front portion of the side of the seat. The upright curve moulding which gives effect at the pillar should be riveted at the panel. On either side, the framing and the moulding will be symmetrical in this example, because the side levers do not interfere. The door framing is indicated by dotted lines with sufficient dimensioning to govern the work. As a further aid, the body builder may consult Fig. 7, which is a front view, from which the lines, and the one important dimension may be had. The hooded dash, as here given, adds to the general appearance of the body, but this phase of the situation is subject to such change as the taste of the owner would seem to indicate, although care must be exercised not to go too far in a matter of this sort for fear the general harmony will be upset. The lower section fastens to the door top piece, and is so designed as to move outward with it. In the selection of the hinges and lock for the door it is worth while exercising some care, and the body maker is enjoined to use screws of sufficient length to fasten the hinges in secure relation.

Roughstuff Can be Mixed as Well as Purchased

Shop-mixed "roughstuff" for body finishing may be compounded by taking equal parts by weight, of keg lead, oil ground, and any good American filler. The two to be thoroughly reduced to a stiff paste by beating in equal quantities of coach japan and rubbing varnish.

Forced Lubrication—Trend in English Practice

By R. K. MORCOM

(Third Installment)

The pump should be of ample size ——Charts are used to indicate the relation of pressure to quantity—— Effect of a choking suction is discussed——Types of pumps are given attention——Result of a series of trials on different types of pumps are shown.

GENERALLY, in designing a forced lubrication system, the following points must be kept in mind:

Have a pump of ample size, with good big suction and delivery pipes. There is a tendency to fit pumps and pipes too small to realize the benefits of forced lubrication. The effect of a choked suction is well shown in curve IV (Fig. 14). From the curve of discharge given earlier it will be seen that the discharge from the clearance spaces is quite appreciable, and too small pipes or pump may lead to the ends of the system being starved. A good rule is to make the discharge from the pump at full speed depend upon the total clearance. Thus, with a plunger pump, if the volume swept out per minute on the discharge stroke be V, and the sum of the peripheries of all bearings at each discharge point be P, then $V = 8 \times P$ is a good value.

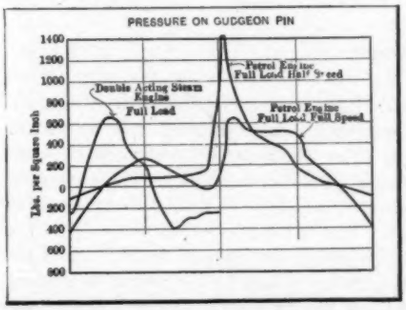


Fig. 10—Chart showing pressure on gudgeon pin and how it varies under different conditions of load and speed

For the main delivery pipe, if B be its bore,

take $B = \frac{P}{480}$,

Another point which makes it necessary to have an ample pump is that due to centrifugal and inertia effects on the oil in the moving parts, variations in pressure occur beyond those due to fluid friction and escape at clearances. To indicate the nature of such influences, a series of diagrams were taken with an ordinary indicator coupled direct to the main bearing, and through a flexible connection to the top end. The curves traced are given in Fig. 13.

Oil pumps of various types are used, the most common being:

(1) Plunger pump.
(2) Gear pump.
(3) Vane pump.

The first is the most positive, and probably the most generally efficient. The second is good, and lends itself to simplicity of design. The third does not appear to be any good for high pressure. Centrifugal pumps are generally unsuitable, especially with thick oil. A series of trials run on different types of pumps are recorded in the curves of Figs. 14 to 19. It will be seen that the horsepower unit is quite small, so that the question of drive is an easy one.

The filter which must be fitted in the system should be efficient and accessible. It would be an advantage to place it in such a position that by lifting a cover it could be at once got at and periodically changed. The spare filter could then be cleaned ready for the next changeover. The filter should have ample area, as the suction pump must be quite free. A good design of filter is shown in Fig. 20, but, of course, to suit special space requirements the design is subject to great modification. A point to be remembered which is often overlooked is that perforated zinc and copper are not good neighbors in an oil well where water may be present. The oil pipes and oil ways should be ample in area, free from sharp bends and corners, and of adequate strength to stand the highest pressures that may fall upon them. Steel pipes made to template are better than copper pipes, since the latter have been found to develop mysterious fractures. Where it is possible, hollow shafts and rods should be used to facilitate the distribution. All oil pipes should be

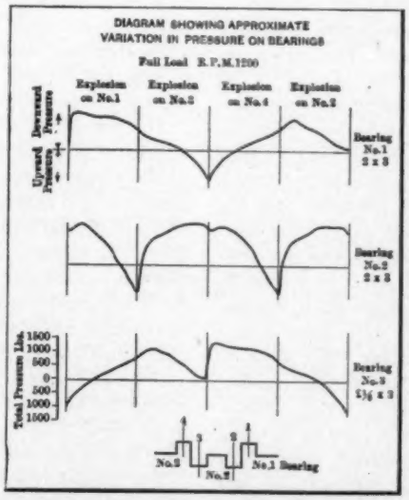


Fig. 11—Diagram showing pressure variations on bearings, also giving total pressures

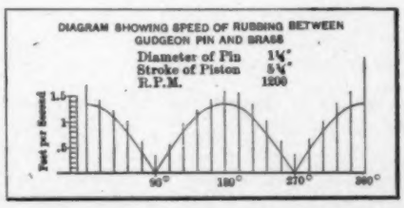


Fig. 12—Diagram showing speed of rubbing between gudgeon pins and brasses under fixed conditions as stated

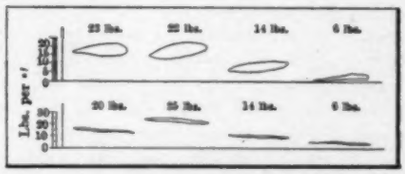


Fig. 13—Method of depicting the pressure in pounds per square inch for given pressures

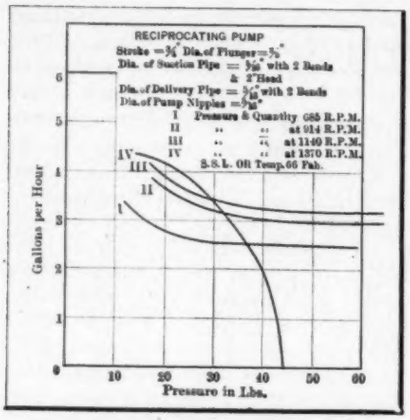


Fig. 14—Showing the capacity of a reciprocating pump under different pressures in pounds per square inch

carried in positions where they will not get in the way of overhauling, and will be protected from risk of damage. It is a good thing to bring the pipes up on the under side of the bearings in motor car engines, since they can be carried close to the cross-frames which usually support the bearings. In fact, the oil ways may actually be drilled in the crankcase casting. The edges of oil holes in parts subject to stress should be carefully rounded, or they may be origins of surface cracks leading to ultimate fracture.

In testing the pumps some trials (see pump trial curves) were taken on heavy oils to show the effect of congelation in cold weather. Owing to the small quantity which can pass, a heavy pressure may come on the delivery pipe and gauge, if fitted. This is one reason for fitting to relieve the pressure. A bye-pass valve alongside the gauge opening into the make-up oil tank was used with success in one instance. The best place for an automatic relief valve is on the delivery pipe close to the pump. Such valves are, however, a source of trouble, and should be avoided; as a rule, a gauge can be obtained to stand far greater pressure than will be put upon it in this way, and still be sensitive at the normal pressure.

A very short time is required to warm up the oil, and the trouble from this source is probably less with forced lubrication than with any other system.

The chief wear in the bearings on a high-speed engine occurs at starting and stopping. A pump very quickly forces oil into a bearing, probably more quickly than the oil will get there in any other systems. A non-return valve on the delivery pipe is possibly of value to ensure the system remaining full. The chief argument in favor of a pressure reservoir supplying oil is based on the need for oil at starting, and such a fitting for the pump to discharge into might be of value.

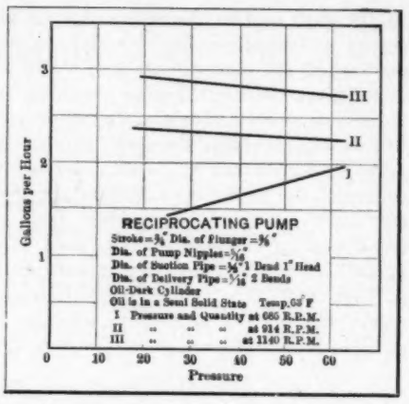


Fig. 15—Capacity of a reciprocating pump of the plunger type with oil in a semi-solid state

Any system in which a charge of oil is used for long periods may suffer from contamination of the oil. An experiment was made on a car fitted with forced lubrication. The sump was filled with a pure mineral oil called "SL," following the viscosity curve given in Fig. 21, and the car run for 3,000 miles in about four months on and off.

Meat from Foreign Exchanges—Cut to the Bone

Digest Along Technical Lines for the Engineer

Which to choose, the soft or the nervous motor, the normal or the pushed motor, is a question now demanding an answer. A similar question was mooted among horsemen. Could thoroughbred stock be used for common work or only for a few star performances each year, to be coddled all the rest of the time? The Americans have obtained excellent work from the refined stock by nourishing it well and giving it suitable care. The problem with regard to automobiles is: Between two motors, one giving 30 horsepower, with 110 mm. bore and 120 mm. stroke, and another giving exactly the same brake horsepower with 85 mm. bore and 160 mm. stroke, which should the purchaser choose?

An examination of the thermic and the mechanical efficiency in both cases will throw light on the question. The motor deriving a given power from the smallest amount of fuel is, of course, most efficient, and the question becomes, therefore, whether the means employed for reaching the higher efficiency are prejudicial to durability or other desirable properties of a motor, or perhaps are harmful under some conditions and not under others. From what is known of motors it is admitted that the utilization of fuel is more perfect in proportion as (1) the temperature of the cylinders is higher, (2) the piston speed is higher and (3) the initial compression is higher. But there is a limit to the possible temperature of cylinders. Lubricating oil decomposes at about 250 deg. C. The inner cylinder walls must be below this heat. In a water-cooled motor the outer walls must be below the boiling point of water, which is 100 deg. C. Other things equal, the air-cooled motor should give a better thermic efficiency than one cooled by water, since fewer calories are lost if the outer walls may be maintained at an external temperature of 200 deg. instead of 100, and, in accordance herewith, all fuel economy tests in the past six years have been won with air-cooled motors. (The author does not seem to consider that, with continued operation of the motor, as many calories may be lost to maintain 200 deg. as 100. The question is hardly one of temperature, but of how many calories must be carried away in order to maintain operating conditions, and this should lead to cooling of the piston rather than of the external portions of the cylinder walls, which play no other part than as conductors of the heat from the inner walls. Some cooling of the piston is actually effected by copious lubrication, and this may account for the winning of fuel economy tests by air-cooled motors. To keep a temperature of 200 deg. from rising further should in reality require the accession of more calories than to keep 100 deg. from rising further, considering that the outside temperature is nearer to 100 than to 200, and will carry away more calories from the hot than from the relatively cool surface.)

The quantities of heat transmitted through a wall of which one surface is at a higher temperature than the other are proportional to the extent of the surface through which the transmission takes place. If 100 calories pass through 1 square centimeter of wall in one minute, 200 will pass through 2 square centimeters in the same time. In a motor, therefore, one should choose the combustion chamber which has the smallest surface with the largest volume. As a spherical form is excluded, this leads to the hemispherical combustion chamber used in many modern motors, or to the system which causes the combustion chamber to remain of the same volume and wall surface during the entire stroke of the piston, by having two opposite pistons always moving in the same direction, as in the Gobron system and some horizontal two-cylinder motors with the two pistons working upon the same crank.

The logical consequence of a hemispherical combustion chamber is the location of valves in the top of the cylinder head, open-

ing directly into the cylinder. The pushed or nervous motor is of this type, while the normal motor has the valves located in little lateral extensions of the cylinder, with plenty of wall space.

Here is a distinct thermic gain in the nervous motor over the normal one, without any loss in robustness or reliability.

With regard to piston speed, or rapid expansion of the gases during the power stroke, it is understood that the loss of calories through the walls is so much greater as the time is longer during which the heat is transmitted. If 100 calories pass in one minute, 200 will pass in two minutes. (This proportionality is scarcely established, nor well founded.) The time during which the hot gases are in contact with the walls should, therefore, be diminished. This is done by piston speed. On the other hand, when the exhaust gas is expelled it is still hot and carries with it many calories which it would have been better to have utilized. To reduce the number of calories lost in this manner the stroke should be lengthened. Here is an apparent contradiction. But, by doubling the speed of the stroke, one-half of the calories which would be lost by lower speed are saved and made available for expansion, which is useful work, and by doubling the stroke at least one-half of the calories so gained are turned into work, although the other half may escape through the added wall space. The net gain is realized in the nervous motor with 85 mm. bore and 160 mm. stroke which has a linear speed of 8 metres per second at 1,500 revolutions per minute. The normal motor, which also runs at 1,500 revolutions per minute, has a linear speed of only 6 metres. But in the first case the piston of 85 mm. diameter weighs less than the piston of 110 mm. diameter; the moving pieces are lighter, and, at the same r. p. m. it is seen that the pushed or nervous motor is less affected by the disastrous inertia of the masses. At this point there should be superiority in durability over the normal motor.

Let us pass to the third thermic factor, the compression. Our nervous motor of 85 by 160 is supposed to have a cold compression of 5.7 kilograms, based on the proportion of total cylinder to compression chamber volume, while the normal motor, 110 by 120, has only 3.5 kilograms initial compression. With these figures experience shows that the thermic efficiency of the two motors is as 36 to 24; that is, that the low-compression motor, for a given amount of work, will consume 36 litres of gasoline, if the other consumes 24. While the saving of one-third of the gasoline consumption, by using the nervous motor, is an advantage, it goes without saying that the mechanism of the high-compression motor is subjected to high stresses and that these must be taken into account in the manufacture and must result in a considerably higher cost of production. Besides, there are materials in all motors which have not the great strength of fine steels. The bushings of piston and wrist pins will be worn down so much quicker as the pressures are higher for the unit of areas. The pushed motor will begin to "knock" quicker than the soft motor. This is bad, but the saving in gasoline will easily pay for new bushings, as often as may be required. On the whole, with regard to thermic efficiency the superiority of the nervous motor seems to be established without serious drawbacks.

Among the means for improving the mechanical efficiency good lubrication comes first, and it must be admitted that this requirement is satisfied as fully in the soft as in the nervous motor. (The author should perhaps admit a little more.) The lateral pressures of the piston against the cylinder wall may be reduced in the nervous motor either by using a connecting rod long in proportion to the crank throw or by having recourse to offset. Our 85 by 160 is an offset motor, while our normal motor is symmetric. The substantial advantages of the offset have been demonstrated, and while the public is still a little wary of this improvement, its mechanical value to increase efficiency is undeniable, and several manufacturers employ some offset without saying anything about it to their clients. The features referred to produce a somewhat high motor, but this is scarcely an inconvenience, except in so far as it also results in a high price. The nervous, long-stroke, high-compression motor is mounted on ball bearings, while the normal motor still contents itself with smooth crankshaft bearings. At this point the public came near causing a fatal reaction, but fortunately experience has finally shown that the prejudice caused by a few errors in dimensions and design was groundless, and the leading houses now employ ball bearings on the crankshaft without misgivings, and their independence of regularity of lubrication constitutes another advantage of the pushed over the soft motor, from the average motorist's standpoint.

In this rapid survey of the situation a few points have been passed in silence, such as the increased pleasure in using the nervous motor and the great flexibility of its power. But, now, there is the driver, the caretaker. It is so pleasant to have a responsive motor that the accelerator remains unused. On the other hand, too many of the nervous motors are not provided with an advance of ignition, although this provision is really indispensable for them, and few drivers understand how to change speed at the proper moment. And the pushed motor demands not only expert driving but also competent care.

In conclusion it may be said that all those who love their vehicle and are willing to give it the care which every high-strung mechanical organism, as well as every animal organism, requires, may safely choose the pushed and nervous motor, particularly if they drive the car themselves. But those who must trust the vehicle to strangers and do not pose over a chauffeur who likes his work, had better be content with the soft motor of the less advanced type.—C. Faroux in *La Vie Automobile*, May 14.

Speaking about Lepape's experiments with two-cycle motors, F. Garlès gives an abbreviated account of the failures which were met and overcome. Lepape had first tried to replace the ordinary compression pump by two pumps, one for air, of a volume larger than that of the motor cylinder, and another for introducing a rich gas taken from a special carbureter. At each turn the pump introduced in the cylinder a larger volume of air than was necessary for filling it, so as to produce complete expulsion of gases, and then the little pump injected the rich mixture. The result was phenomena of condensation interfering with operation. Then he thought of using a small pump for injecting the liquid gasoline together with a jet of compressed air, also without success. The direct gasoline injection pump was also quickly abandoned. Then came the Giffard injection. A motor based on this principle gave a regular operation, but much too high consumption of fuel. The system of introducing the fresh gas by means of the suction produced in the cylinder automatically by the rushing out of the burnt gases was then tried. "This motor," says Lepape, "worked with extreme regularity but without giving much power. Then I varied the volumes of dead space between the suction pump and the motor, so as not to get too strong a vacuum, which aspired the fresh gas unnecessarily fast. It proved very difficult to find the exact volumes of dead space which should exist above the pump to correspond with the maximum speed and which would also work well with low speed."

With regard to the two-cycle motor's inclination to overheat, Lepape says: "I have been struck with the contrary experience with motorcycles, an experience often repeated. Two motorcycle motors of the same power, but one two-cycle and the other four-cycle, are set going without load at the same time, and the two-cycle motor will always run longer without overheating than the other, usually three times longer." Lepape explains this by the action of the bottom ports for exhaust in the two-cycle motor as compared with the jamming of exhaust gases in the top of the cylinder during their expulsion in four-cycle motors. Explaining the mechanical superiority of two-cycle motors, Lepape points to the waste occurring in four-cycle motors, because induction and expulsion and compression must be done with piston rings whose tension and friction with the cylinder walls are determined by the requirements for the power stroke. "The mechanical work absorbed by the frictions is therefore much greater in the four-cycle than in the two-cycle motor," concludes Lepape.—*La Technique Automobile et Aérienne.*

Questions That Arise—General in Scope

Completion of questions in relation to electrolyte for batteries——Principle employed in the removal of carbon from motor cylinders——Discussion of the dangers involved——Danger involved in making experiments——Precautions to take——Curves showing the pressure which will be generated in a cylinder, first by gasoline, and second by gunpowder——Gunpowder may be used to start motors——It is too much of a hazard for the average autoist——Requires special mechanism.

[110]—Granting that nitrates will behave to the greatest detriment of the battery, and assuming that it is of grave importance to eliminate such "forming solutions," how should the test be made?

Procure a test tube and proceed as follows:

(a) Place 25 grams of the electrolyte from the battery in the bottom of the test tube;

(b) Add 10 grams of solution of proto-sulphate of iron;

(c) With great care, add 10 grams of (chemically pure) concentrated sulphuric acid.

If there is nitric acid present, a brown stratum will appear between the electrolyte and the concentrated sulphuric acid. This test may fail if the presence of nitrate is as a mere trace.

MORE PRECISE TEST MAY BE MADE AS FOLLOWS

Procure a nitrate test tube as illustrated last week and then proceed as follows:

(a) Place chemically pure copper filings in the bottom of the tube at *a*;

(b) Place a few drops of proto-sulphate of iron solution in the neck of the bent tube *b;*

(c) Apply heat (gently at first) by means of an alcohol flame, at the point *a;*

(d) The test will fail if much chlorine is present.

In the absence of enough chlorine to defeat this test, provided nitrate is present, the color of the electrolyte will change to a blackish brown.

Suspecting the presence of chlorine, the process must be extended; add a small amount of gold leaf, and somewhat more of (chemically pure) concentrated hydrochloric acid to the electrolyte; boil. If nitrate is present in the electrolyte, some of the gold will dissolve.

If any of the gold dissolves, it will be denoted when a few drops of proto-chloride of tin is added; the color will develop the purple Cassius. This test is very delicate, and will develop the merest trace of nitrate in the electrolyte.

[111]—How may one determine the effect of temperature on the specific gravity of sulphuric acid electrolyte?

The tabulation as here offered will be a sufficient aid for the purpose.

SPECIFIC GRAVITY OF SULPHURIC ACID (ELECTROLYTE)

At Temperatures Below 60° F.

Temperatures	30° F.	40° F.	50° F.	60°F.
Sp. Gr.	1.1593	1.1562	1.1531	1.1500
"	1.2096	1.2064	1.2032	1.2000
"	1.2620	1.2590	1.2530	1.2500
"	1.3090	1.3060	1.3030	1.3000
"	1.3620	1.3580	1.3540	1.3500
"	1.4144	1.4096	1.4048	1.4000

At Temperatures Above 60 F.

60° F.	70° F.	80° F.	90° F.	100° F.	110° F.	120° F.
1.1500	1.1469	1.1438	1.1407	1.1376	1.1345	1.1314
1.2000	1.1968	1.1936	1.1904	1.1872	1.1840	1.1808
1.2500	1.2470	1.2440	1.2410	1.2380	1.2350	1.2320
1.3000	1.2970	1.2940	1.2910	1.2880	1.2850	1.2820
1.3500	1.3460	1.3420	1.3380	1.3340	1.3300	1.3260
1.4000	1.3952	1.3904	1.3856	1.3808	1.3768	1.3728

[112]—Where can the reagents specified for use in testing for impurities in storage batteries be procured?

Any chemist will furnish them.

[113]—What is the principle of the removal of carbon from the combustion chambers of the cylinders of motors?

Carbon, which is the main element of the crust which forms, may be removed if it is combined with oxygen to form a gas as CO or CO_2. This may be accomplished by introducing some oxygen compound into the cylinders, which will, in the presence of the heat of combustion, disintegrate, and in the process of separating into its elements, free the oxygen and induce the formation of a gas, utilizing the carbon of the crust in the new organization. There are two oxides of lead which have this property. Lead oxide (PbO), and litharge or red lead (Pb_3O_4), the latter being the most efficacious for the purpose, simply because there is more oxygen in it. What happens is this: There is a sufficiently high temperature to melt lead, and the oxygen at the instant it is unlocked from its bond with the lead by the heat combines with the free carbon which is present in the crust, forming CO or CO_2. The new combinations are in gas form; CO represents carbon monoxide, and CO_2 is carbon dioxide. The residuum is metallic lead; it will either be heated sufficiently to vaporize and will pass out through the exhaust port in this form, or it will remain as molten metallic lead; the chances are that it will be driven off as a gas.

Manganese dioxide is another of the oxidizing agents that is relied upon to flux with. The formula for this compound is MnO_2; it is black in color, opaque, and a good conductor of electricity. When heated alone it is infusible, but gives off oxygen, forming Mn_2O_3, or Mn_3O_4, depending upon the intensity of the heat. In the presence of carbon the manganese dioxide is changed to MnO (manganese monoxide), and the carbon takes up the oxygen, forming carbon monoxide, or carbonic acid.

The exact composition of the decarbonizers which are used in motor cylinders, as furnished by the various compounders, has not been published; they may belong to the class as above, or they may be of that class of chemicals, as kerosene oil, which merely creeps in behind the crust, and detaches it from the walls of the cylinders. This latter principle is employed in connection with steam boilers for the purpose of loosening the scale, and it is given preference by some engineers on account of its ability to destroy the bond of the scale to the steel, without inducing oxidation.

It has been found that the so-called carbon formation in motor cylinders is a combination of carbon and silicon; the silicon comes in through the carbureter, and represents quite a large proportion of the whole crust. The silicon retards the action of the oxidizers which are capable of taking up the carbon to form compounds, for the reason that the carbon is shielded by the silicon.

Just how the silicon can be removed is a matter which will have to be struggled with; when the carbon is floated away as a gas, the silicon will remain, and it may be that a certain proportion of it will float out; it is not heavy in its "dust-like" state, as it is sucked into the cylinders through the intake; the one trouble lies in the paste-like mass it falls into as it mixes with the lubricating oil which is being continually injected into the cylinders.

Lead oxide has one facility from the point of view of silicon; a double silicate is formed if the heat is high enough, and the infusible character of the original silicon is thus reduced to a fusible formation, in which state it may more readily depart from the cylinders.

[114]—The question is frequently asked, Will the carbon remover (as it is called in the trade) attack the walls of the cylinders?

This is a question which thwarts answering when the composition of the carbon remover is unknown.

[115]—What is the composition of cylinder iron?

The composition of cast gray iron, as it obtains in certain average cylinders, may be taken to be about as follows:

COMPOSITION OF CAST-IRON CYLINDERS

Carbon		Average of Other Elements			
Combined	Graphitic	Silicon	Sulphur	Phosphorus	Manganese
0.45	3.45	1.19	0.14	0.14	

[116]—What is the significance of this?

It is the graphitic carbon (free carbon) which is in the greatest presence, and it is this carbon which would be open to attack.

[117]—Would it be attacked?

It would if the oxidizing agents were in sufficient presence to act upon all the free carbon which might abound in the crust, and excess of the oxidizing agent were to be present. These agents are noted for their intense oxidizing properties, and it is for this reason that they are classed as "fluxes" by analytical chemists, who use them accordingly.

[118]—How may this matter be investigated simply and the safety of a compound be established?

Polish a specimen of cast gray iron and immerse it in a solution of carbon remover; if it does not eat the graphite out of the polished surface it is safe to use in a cylinder of a motor.

[119]—At what temperature should the test be made?

First cold, and then at the higher temperature which obtains in the combustion chamber of a motor.

[120]—What is the high temperature which will have to be utilized?

That which will melt lead.

[121]—What is the melting point of lead?

Lead melts at 617 degrees Fahrenheit (334 degrees centigrade).

[122]—What is the simplest way of going about it?

(a) Place enough pig lead in an iron melting pot to form a bath; (b) place the carbon remover solution in a second and smaller receptacle; (c) put the specimen of polished cast iron in the solution of carbon remover; (d) place the pot of lead on a suitable fire and urge the heat until the lead melts; (e) sprinkle powdered charcoal over the surface of the molten lead in order to prevent the lead from oxidizing; (f) place the (smaller) receptacle (holding the cast-iron specimen and the solution of carbon remover) in the molten lead bath; (g) maintain an even heat for several hours, if necessary, and when the process is thus terminated, remove the specimen of cast iron from the inner receptacle and note if it is "etched."

[123]—Is there any danger attached to the process?

There may be; it is never safe to experiment with unknown chemicals.

[124]—What are the possible sources of danger?

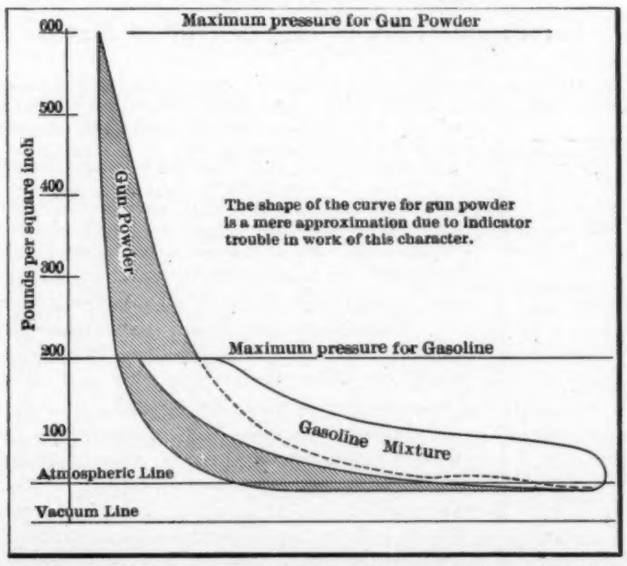


Diagram Showing the Characteristic Difference Between Pressures Due to Gun Powder and Mixtures of Gasoline

(a) Explosives; (b) Inflammable; (c) Poisonous fumes.

[125]—What is to be done to avoid these dangers?

(a) Let an experienced chemist conduct the test; (b) heat a grain (a very minute part) of the carbon remover, under conditions of suitable protection, and note if it explodes; (c) take a second minute division, place it on an anvil, strike it a sharp blow and note if it detonates; (d) heat the anvil, then repeat the experiment, and note if detonation will follow a blow when the compound is heated; (e) in order to observe if the compound will burn, take a spark-plug out of one of the cylinders of the motor, place it in the solution in such a way as to get the benefit of a spark; complete the high-tension connections just as when the spark-plug is working in a cylinder; crank the motor, and when the spark is generated at the plug which is placed in the solution, if it is inflammable it will be readily noted. The spark should take place just at the surface of the solution so that atmosphere will be free to sweep over the surface and provide oxygen to complete the set of conditions which underlie success in the process of making a fire, i.e., fuel, oxygen, and a flame.

[126]—Will these experiments, if they show nothing, be all that is necessary to prove the absence of danger to the experimenter?

Not necessarily; besides avoiding the inhalation of fumes, there are always the precautions which must be taken when an experimenter is dealing with a series of unknown quantities.

[127]—Is there any reason for believing that there is a hazard of moment involved in this experiment?

No. It might even be pointed out that there is practically no chance of getting into trouble; this is no reason for going about it in such a way as to have to bear the brunt of an explosion if one is induced. All research work is dangerous—it is a case of dealing with unknown quantities.

[128]—Is it not possible to start a motor by means of gunpowder?

Yes. This method was employed in "Raymond" engines, as manufactured for stationary work about fifteen years ago.

[129]—How was it managed?

(a) Black blasting powder (BB DuPont) was loaded into a cartridge; (b) the cartridge was placed in a breech-block in the combustion chamber of one of the cylinders, and when the piston was over the dwell point, on the down stroke, a firing pin so placed as to dent the cap was struck a sharp blow. The powder thus ignited performed the function that is ordinarily performed when gasoline mixture is compressed and ignited.

[130]—What is the matter with this idea?

Nothing. The cylinder of the motor which is fitted with the breach-block, in which the powder is placed, is to all intents and purposes the equivalent of a cannon. The only question is, should cannons be made of cast iron; unless it is proper to add that cannoneers are supposed to have great skill and some bravery.

[131]—How did the idea work in the instance cited?

Very well; there was only one casualty; it was due to the use of an excess of "smokeless" powder. The cylinder walls of the Raymond engine were about 1 inch thick; in automobile motors the walls are rarely ever more than 5-16 of an inch thick.

[132]—What is the reason why danger is courted when gun powder is substituted for gasoline mixture?

Gasoline mixture is relatively slow burning, and the piston is capable of receding swiftly enough to prevent the formation of a high-pressure wave. The two curves, as here given, will tell the tale better than words. As the curve depicts, the maximum pressure for mixtures of gasoline is nearly 200 pounds per square inch. In the case of gunpowder it is given as 600 pounds per square inch. In a motor of the automobile type, during some experiments which were conducted a few years ago, it was found that the pressure due to the use of gunpowder was frequently very much higher than that as here given. The point to be made here, however, is that the piston cannot accelerate at a sufficient rate to run away from gunpowder pressure fast enough to prevent the pressure from piling up at the terrific rate which spells hazard.

Showing Connections of 4-Cylinder Coil

Editor THE AUTOMOBILE:

[2,301]—I have an automobile which is fitted with a magneto ignition system, and a single coil auxiliary. Please show the connections, if a 4-coil auxiliary system is used, with the understanding that separate spark plugs will be employed.

Kingston, N. Y. SUBSCRIBER.

Fig. 1 shows the arrangement of the 4-unit coil, storage battery, timer, and spark plugs. It is so arranged and marked that by following out the connections no further information will be required.

Carbureter Adjustment Is Unruly

Editor THE AUTOMOBILE:

[2,302]—I have a carbureter on my —— car, which has a knurled disc on the end of the needle valve, and a lock spring as shown. The carbureter gives trouble, although it works all right for a time after I make an adjustment of the needle valve. I do not understand, however, why the adjustment does not remain permanent. Is the trouble due to temperature changes?

Newburgh, N. Y. READER.

It is a great mistake for an autoist to jump to an impossible conclusion when the performance of a carbureter is improper. In this case there is no temperature question involved, such as will give serious trouble. The real difficulty lies in the lack of permanence of the locking method, and the needle valve adjustment is disturbed. The remedy will lie in the direction of a proper fit of the needle valve stem where it threads into the casting, and a security lock. If the spring does not hold, replace it with one that will (see Fig. 2).

Overhanging Lug Source of Trouble

Editor THE AUTOMOBILE:

[2,303]—I enclose a sketch for your information, which shows that the exhaust pipe is held in place by two studs, one of which screws into a lug which extends down from the underside of the exhaust chamber. The lug broke off. Is there any way by which I can have it fixed?

Wilmington, Del. K. A. C.

It will be extremely difficult to do anything with this sort of a break. The extension lug is bad designing. Autogenous welding, however good it may be in general, cannot make the lug any stronger than it was in the first place, and it proved to be below the requirement. One way perhaps, would be to have the lug autogenously welded, and then put a 3-16 inch plate over the whole face, and the manifold up against the plate. In this way the 3-16 inch plate will furnish the strength necessary, and it will be held in place, to some extent by the lower stud, but in the main by the upper stud. Asbestos packing may be put on both sides of the plate to make a tight joint.

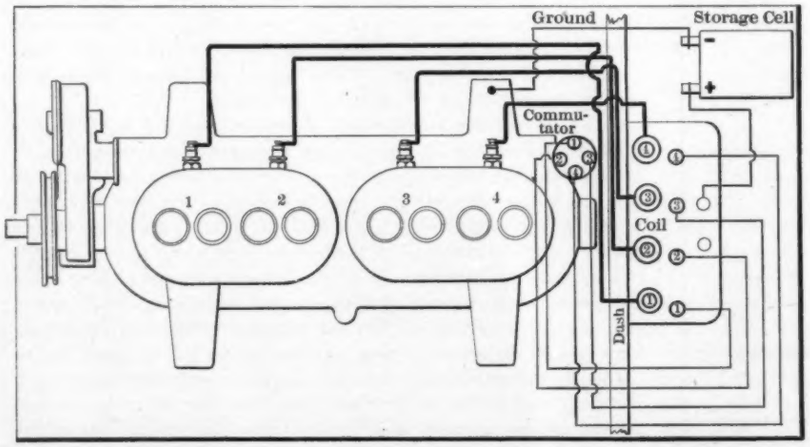


Fig. 1—Diagram of connections of a four-coil ignition system to spark plugs from a storage battery

Spark Plugs Have to Be Tested Occasionally

Editor THE AUTOMOBILE:

[2,304]—In my motor, the spark plugs seem to soot up too soon, considering the performance which is obtained in other types of motors, and the space is so cramped that it is a good deal of trouble to take out the spark plugs and find a place to lay them down without undoing the connections, for the purpose of observing if the spark is good. In the first place, I would like to know why I have this trouble, and I would also be glad to have any suggestion you can offer which will make the work more agreeable.

Baltimore, Md. C. S.

The sooting up of the spark plugs may be due to a variety of causes, prominent among which are (a) an excess of lubricating oil; (b) lubricating oil which is not suitably built for cylinder work; it may have too much free carbon, or the flash point may be too low (if it is mineral oil); if it is not mineral oil it should not be used for this character of service, although certain forms of vegetable oil have been used with success, notable among which castor-oil may be mentioned; (c) too much gasoline; (d) spark plugs in the wrong place; they work best on the intake side.

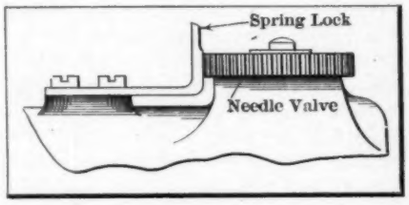


Fig. 2—A troublesome lock for a needle valve on a carbureter

Fig. 4 shows a scheme which helps considerably when it is necessary to remove the spark plugs from the cylinders and test them out. The spark plug A may be screwed out of the cylinder and then inverted, after which it is placed in a slot in the end of the bent flat iron member marked B. It is a convenient arrangement which any autoist can make for himself.

Number of Cars in Use in United States

Editor THE AUTOMOBILE:

[2,305]—Can you inform me as to the total number, and approximate value of the cars in use in the United States; also the value of the cars in use in the United States; also the value of the 1910 output.

Warren, Ohio. TRUMAN GRISWOLD.

Including foreign makes of automobiles, and discounting for the cars which are out of commission for various reasons, it is believed that the balance of automobiles in actual use will approximate 310,000, counting up to the 1910 output. What these automobiles cost originally is a matter which will scarcely be worth considering, but their present value, on a taxation basis, might be fixed at $620,000,000.

The 1910 output has been conservatively estimated at from 200,000 to a maximum of 280,000 automobiles, and the work involved in their construction, including all of the items which might well be considered, represents the comfortable sum of $485,000,000, an estimate which is believed to be conservative by those conversant with the situation.

All About Spark Coils for Ignition Work

Editor THE AUTOMOBILE:

[2,306]—1.—Please explain briefly the construction of a spark coil as used with battery ignition, giving the sizes of wire, and the amount of each.

2—What is the nature of the change of the current after leaving the coil, or that in the secondary winding?

3—What is the difference between direct and alternating current?

4—Explain what is meant by "selective-type transmission."

Erie, Pa. WILLIAM O. YATES.

1. Each unit of the spark coil is made up of an iron core, which is composed of a bundle of soft iron wire, about 3-4 of an inch in diameter, and about 6 inches long, over which an insulating spool is placed, upon which spool are wound first a primary coil, composed of about 1-2 pound of No. 36 double cotton insulated copper wire, and second the secondary winding of about 1-2 pound of No. 18 double cotton insulated wire. It is necessary to insulate the primary from the secondary with great care, using oiled silk or paper, overlapped at the joints.

2. The secondary current will be a modified prototype of the primary current; if an alternating current is impressed upon the primary windings, a somewhat modified form of the same wave will be induced in the secondary windings. If the primary current is periodic and pulsating the secondary current will be periodic and pulsating also. If a direct current is used an interrupter must be employed, otherwise the step-up transformer, which is what it amounts to, will fail to work. There must be a variation in the primary in order to produce induction in the secondary winding of the same coil to get the result.

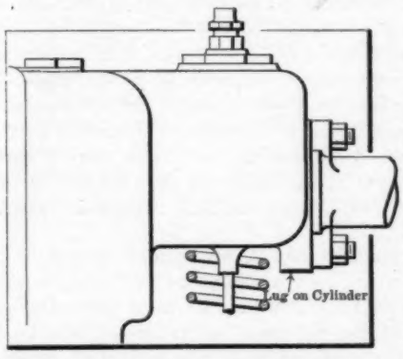


Fig. 3—An over-hang lug on a cylinder that is likely to break off any time

3. The difference between a direct and alternating current is indicated by the language. A direct current is one which flows in one direction only. An alternating current is one which flows alternately in opposite directions.

4. A selective - type transmission is one which is so contrived that the operator may select at will the gear into which he wishes to engage, without having to engage the respective gears from low to high progressively, or from high to low progressively.

Merely Looking for Automatic Carburetion

Editor THE AUTOMOBILE:

[2,307]—On account of a difference of opinion between various automobile users, I wish you would answer the following questions through your inquiry columns:

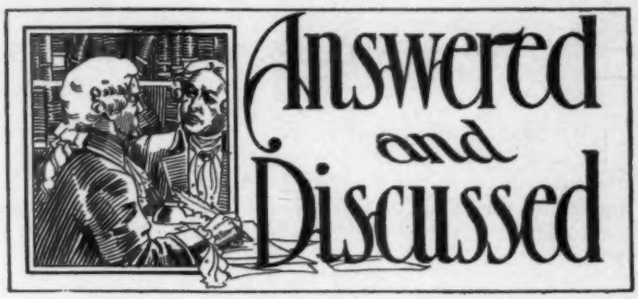
1.—Has it been your experience, or in your opinion is it possible, for an internal combustion gasoline motor to be so built that spark and throttle can be rapidly advanced with the machine under load and still not cause either a spark or gasoline knock?

2.—Is it possible to get a carbureter which, when adjusted for normal temperature, will work equally or nearly as good without adjustment on a cool or damp day?

St. Bernard, Ohio. LESTER E. KEMPER.

1. Sudden changes of the character or quantity of mixture when a motor is laboring should cause trouble. Shock is a bad condition to induce in anything. A motor is no exception to the rule.

2. A properly contrived carbureter will compensate within reasonable limits under all likely conditions of temperature change; the auxiliary air is usually heated before it enters the carbureter so that weather questions are more or less eliminated. The fact remains that the viscosity of gasoline changes considerably with temperature.



Trouble Will Come Soon Enough

Editor THE AUTOMOBILE:

[2,308]—I have had several arguments with friends as to the advisability of using ground cork in a selective transmission. also as to the use of Dixon's graphite and cedar sawdust mixture. I rather favored the idea that either ingredient would have a tendency to keep lubrication away from either the roller or ball bearings. Am I correct in this supposition? What do you advise where first and second speeds are not so quiet as one might wish?

Romney, Ind. C. L. B.

If the transmission gear is not properly made, and it emits a tuneless grind, no amount of sawdust will eliminate the prime difficulty. This cruel treatment would probably destroy a good transmission gear. Perhaps the noise can be reduced to a tolerable level by copious applications of beeswax, which will have to be applied to the teeth of the gears after they are warmed up sufficiently to melt the beeswax. Beyond this, a proper amount of suitable transmission gear grease should be used. The transmission gear grease may carry the right proportion of Dixon's graphite, which is regarded as an efficacious lubricant. The treatment here recommended will not interfere with the lubrication of the ball bearings. It is useless to recommend that you use one of the available gear ratios; the road condition will settle this phase of the problem automatically. Fix the automobile up so that any one of the gear ratios may be used when the road condition demands, otherwise the automobile will have all the minus virtues of a sore thumb.

Air-Cooled Motor Starts on the Spark

Editor THE AUTOMOBILE:

[2,309]—I have started a 4-cylinder air-cooled motor on compression after removing plugs and cleaning them, which was said to be impossible in your "Letters Interesting, Answered and Discussed." Please let me know why this is impossible.

New York City. SUBSCRIBER.

This question was very completely answered in THE AUTOMOBILE of June 2, under the caption "How About Starting on the Spark," beginning on page 998.

In the meantime it might be well to add that starting on the spark, when the conditions are such as to make it possible, is no very great sign of unusual quality; it is one of the things to be expected of a motor with enough cylinders, provided the gasoline is heated up to its boiling point. In other words this is largely a problem in connection with the gasoline, and to a very slight extent with the motor.

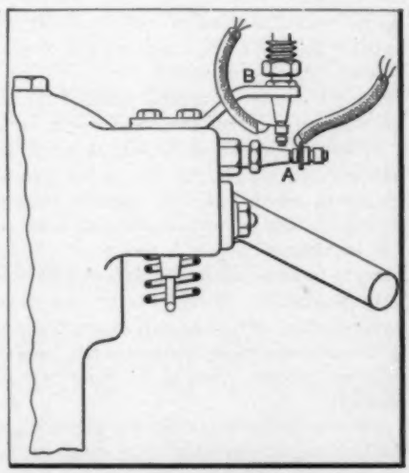


Fig. 4—A means for facilitating the testing of spark plugs, especially when room is at a premium

Studies in Aviation Theory and Practice

By MARIUS G. KRARUP.

THE machine will stop advancing in the new upward direction and it will fall, unless it is self-righting; that is, unless the wind, in tilting the machine upward, has stored a power of gravitation which, in conjunction with the arrangement of the air resistance to movements of its areas, will bring it back to a horizontal position.

If the machine is tipped too far laterally at the same time as upward, the ability to return to equilibrium by operation of rudder planes of any kind, is still further reduced. Reserve power in the motor, to be turned on at such moments, would, however, be very helpful, but would tax the aviator's art or presence of mind.

If the motor becomes stalled at the same time, as is more likely to happen during a disturbance of the balance than when the machine is on an even keel (carbureters in which the gasoline might swash away from the needle valve would seem to be dangerous in this respect), and the machine takes a position in which gravity will not operate it safely, there is no art which will restore the equilibrium by means of rudders. This property must be in the machine itself. In other words, either control by rudder action must be supplemented by some form of control by power (both gravitation and speed are, of course, power elements) which, unlike the ordinary speed of the machine, is independent of the normal but not assured coincidence of direction of propulsion with direction of motion, or, the two available factors, gravitation and the shape and distribution of areas, must be enlisted by the designer of the aeroplane to establish a progressive resistance against the disturbance of equilibrium. Such progressive resistance compounded from the two factors mentioned, as will be readily understood, is the essence in the property of self-righting for a heavy body in air, though the same property is more simply constituted in the case of the lifeboat. By calling both these means into requisition, one for forcibly restoring equilibrium under conditions when the customary rudders become useless, and the other for maintaining it, some independence of weather would seem to be in prospect. And both these means seem to be available in the aeroplane without departing far from its type. A discussion of them should constitute a study in equilibrium.

Arrived at this milestone in the analysis of equilibrium, one finds the subject split into two divisions, equilibrium by control action, which should be reduced to its simplest and least perplexing form, so that the art of aviation shall not depend too much upon exceptional personal traits or qualities in the aviator, and inherent equilibrium or stability, which must be built into the machine, must be the basis for control action, but must not be so pronounced as to interfere with the range of this control action or with quick results from control action within the desirable range of the latter. It must permit considerable deviation from the normal horizontal poise of the structure without offering great resistance, but the resistance must be progressive.

If either control or stability depends upon speed, it is not well secured, as motors may be stalled and wind may interfere with direction, which is a vital element in speed, and may also interfere with that advance movement with relation to the surrounding atmosphere which is the other vital element in speed, as this term is understood in connection with this subject.

In aeroplanes of the present day there is some stability and some control, but, as shown in practice and explained in the foregoing, at least in part, not enough stability to make control safe and not enough control to make up for the shortcomings in stability.

All the control elements are rudders adjusted to act only when momentum is available in a direction which comes within the range of about twenty degrees on either side of the normal direction of the rudder areas, or when gravitation may be made to act within the same narrow range. There is lacking a power element which, assisted by increased stability, will produce control or rudder action when ordinary rudder action would be exhausted. For example, the machine is tipped laterally by a gust of wind, while the motor is stalled. The natural balance of the machine—and this balance must exist and does exist in every machine which is capable of descending safely when the power gives out—now permits the aviator, even if the momentum is at the minimum, which makes the tilt-rudder or deflector useless, to take the descending-tilt and gain some speed by the power of gravitation, and by means of this speed he can correct the lateral tipping by warping his planes, and he can emphasize this righting action by clever use of his side-steering rudder. Both these control actions would be of very slight effect if he could not gain speed first by gravitation. Now it is evident that in unfavorable weather he might not get sufficient time to gain speed by gravitation before the machine was upset laterally. Also, if the wind had tipped his machine backward as well as laterally—with the motor stalled and momentum gone—his natural balance, which ordinarily tends to produce a suitable descending-tilt, may be so nearly exhausted by the half-upset position of his machine in the air that he cannot get back to a safe position at all with the means at present employed. He needs the new additional control element referred to above, and, like all control elements now employed, it must be actuated by power of some kind, in order to fight the disturbing gust of air. The supposition is that the motor power has failed or has become useless for control, because the only areas it has to act upon, the customary rudders, have been thrown out of commission by the power's insufficiency to produce the progress through the atmosphere which is required for rudder action. This is the situation, when the wind throws the nose of the machine so sharply upward that the sustaining action of the planes is lost or almost lost, and it consequently remains for momentum and direct propeller thrust to overcome gravitation.

The forms of power available for the new control element are motor power, which it is not permissible to depend on, gravitation and the aviator's muscular power. All these are used in the customary control system, but their use is limited in utility by the constant relations established in the aeroplane by its designer between the direction of the power thrust and the direction of the main plane, or planes, as well as the normal direction of the control planes. It has been the gist of the foregoing remarks to indicate how the wind may make this limitation a sharp and decisive one, acting in conflict with gravitation instead of in unison with this force. Now, what is left, without changing the type of an aeroplane completely, in order to give the necessary range and power to control action? Gravitation is the only force which acts in a constant direction, wind or no wind. It ought to be the sheet anchor of the aeroplane. The motor power which is more or less unreliable and whose direction depends upon the very wind which it is meant to counteract through its influence on control planes and main planes is intrinsically not quite fit for the work. The main and control planes, which are also shifted around in the wind and whose action moreover depends on either the motor or gravitation, preferably both, are also in themselves insufficient. How can gravitation be called to work to right the machine, independently of the position which the wind has given it? By employing one constant force always available, which is the aviator's muscular power, to release the force of gravitation or overcome the force of gravitation, as the case may be, and thereby changing the relations of the main planes, to the center of gravity of the machine and to the direction of the machine's movement against atmospheric resistance.

Relative mobility of the weighty parts and the planes of the machine is the only means left for control action, after the wind has exhausted the resources at disposal in the form of natural

stability and ordinary rudder action. It is also the means employed exclusively by all winged creatures. The distinction between this means and rudder action is that it acts directly on the main planes by muscular power or gravitation, while the rudders act indirectly on the main planes by the intermediation of either the motor power or gravitation, and may fail to act. Whether relative mobility of the parts of an aeroplane should be employed in preference to the use of various small control planes or as auxiliary to the customary system, is a question on which theorists and also designers in general will naturally differ. For the avoidance of complicated design and the extra weight it involves, sole reliance upon relative mobility between the weighty and power elements of an aeroplane, on one side, and the area elements on the other side would seem to be advisable, and this would also simplify the art of the aviator. But in practice less radical measures are likely to prevail. The warping of wings in the Wright machines and in those of other designers who follow the Wright example, may be mentioned as a control action akin to the measure proposed, in so far as it consists in a change in the position of the main planes effected by direct muscular action of the aviator—without the assistance of gravitation, however. And, being of very limited scope, it is used principally for steering and only in slight degree for assisting in preserving the equilibrium. The shifting of weights, especially the weight of the aviator's body, has been frequently proposed as a means for balancing, but is insufficient for effecting quick changes in the tilt of the large main planes or in their lateral equilibrium, while also deficient in not affecting the relations between the planes and the direction of the propulsion. When equilibrium is to be regained, this means, of course, that the relations at that moment existing between the various elements require to be changed, and the system which permits the changes to be made most radically is the most effective and resourceful one.

Going a little more into construction details, the system which seems to be indicated as necessary for safety in bad weather by both practice and theory, practice having shown the present system insufficient, involves the rotation through a small angle of the entire power plant and the aviator, as well as the whole system of control planes or whatever is retained thereof, in relation to the main planes.

In order to do this, the main planes or plane (if a monoplane is considered) must doubtless be divided into two wings which may be adjusted separately, the motion of one compensating against that of the other, as in warping, or the two wings may be operated together, as for rising or descending. In the latter form of action, the control movement of the aviator will be either assisted or resisted by gravitation, according to whether the weighty portions are to be raised or lowered, but under all circumstances the effect must be a mutual one; that is, the full motion will be divided between the portions carrying the power plant, aviator and control members, on one side, and the carrying planes. Whether such adjustability is required laterally as well as with regard to the fore-and-aft equilibrium may be doubted, because the action which turns one wing of a main plane sharply to a new angle also affects the sustentation on that side, and it seems possible that all necessary control motions may be accomplished without special means for adjusting the lateral balance, just as no such means exist with the present system, but in Nature all fliers have in addition the ability to raise one wing tip much higher than the other, thereby reducing sustentation on the side which is raised most.

While there seems to be no logical escape from the necessity of the system which has here been indicated in its large features, the mechanical details involved in executing it mean no doubt a considerable addition to the cost of production for aeroplanes and the employment of much ingenuity to keep the weight of the machine within bounds, since the relative movements of the two principal portions of such a machine as contemplated call for much greater strength of construction than is necessary in the present type.

The smaller these movements may be made, while yet sufficient for their purpose, the better are evidently the chances for devising a control apparatus which will not be too bulky and weighty, and the better may all forces be economized in its operation and the work of the aviator lightened. All other suitable means for preserving equilibrium, in addition to the system of relative mobility of parts, should therefore be employed. Among these means inherent stability comes perhaps first, and this forms a separate subject. But reserve power and the greatest possible reduction of the areas of the carrying planes are also important elements. The reserve power which may be thrown into the propellers and faithfully transmitted by these driving-wheels of the aeroplane to the responsive atmosphere will permit propulsion at a steeper angle than a lower power will support, and may save the balance of the machine when the wind may have cast it around to such a steep angle. Generally, it is readily understood that in any position of the machine the speed resulting from propulsion is always a helpful factor, as the effect of every control movement is governed by both speed and gravitation, and speed is the variable of these two factors. Both the development of good motors and the efficiency of propellers are therefore bound up with the problem of equilibrium. With regard to the area of the planes, this must of course be determined in part by the load and somewhat by the speeds which are considered maximum for safe starting and stopping, but, other things equal, it evidently serves equilibrium to employ planes with a maximum of sustentation per square foot, a strongly curved plane rather than a flat one and all improvements which may be devised to make sustentation efficient, as the disturbing influence of the wind will as a rule attack the machine with a force commensurate with the areas and without regard to their penetration or resistance to propulsion. And the smaller resistance to propulsion is at present the only argument in favor of flat planes or planes with small curvatures. When operating with muscular power and gravitation as the active factors for changing the relative positions of planes and weighty portions, it is also evident that the small areas are more easily pulled to the position it is desired to give them.

It is believed to have been shown that equilibrium is not a separate property of an aeroplane or to any great degree the result of an art of the aviator, but a product in which all factors in the construction of an aeroplane enter deeply for consideration. The question of inherent stability remains for separate discussion, its merit requiring treatment in a way to bring out, unhampered, the salient features.

Coming Events in the Automobiling World

June 20-July 6....Detroit, Mich., Industrial Exposition, Detroit Board of Commerce.

Races, Hill-Climbs, Etc.

June 14-30.....Cincinnati, Seventh Annual National Reliability Run for Glidden Trophy, Through the Southwest.
June 25.....Port Jefferson, Long Island, N. Y., Hill-Climbing Contest, Automobile Club of Port Jefferson.
June 25-26.....Roadability Run, Automobile Club of Philadelphia, to Lake Hopatcong, N. J.
June 28-30.....St. Louis, Mo., Three-day Reliability Run, St. Louis Manufacturers' and Dealers' Association.
July 1-4.....Indianapolis, Ind., Track Meet. Cobe Trophy Race—Held on Speedway Track, Chicago Automobile Club.
July 1-10.....Los Angeles, Cal., Road Carnival of Licensed Dealers.
July 2-4.....Los Angeles, Cal., Speedway Meet.
July 2-4.....Wildwood, N. J., North Wildwood Automobile Club, Speedway Races and Club Run.
July 4.....Auburn, N. Y., Hill Climb of Automobile Club of Auburn.
July 4.....Cheyenne, Wyo., Track Meet of Cheyenne Motor Club.

THE AUTOMOBILE

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WHY should the hoarders of gold cry "wolf" every time they see an automobile go by? It is easy enough to understand the mutterings of those who, in view of their cuteness, coupled with a little learning, are trying to earn their stipend. But, why should men who have money to lend want to stifle an industry? The automobile has the fault of being relatively new; for this reason it is open to suspicion. It is right to be conservative, but it is a crime to be stupidly so.

* * *

The best answer to the charge that men who cannot afford it are buying automobiles, is at the beck and call of every man in America; let him but look over his list of acquaintances, and decide for himself whether or not the owners of automobiles that he knows are beggaring themselves.

* * *

It is claimed that the automobile is a plaything; that it has no economic value; that it lures men into idleness. Must a man work his nails off, reduce himself to a stage of mute idiocy by all work and no play, and then step aside for a newer, fresher slave? Is there no sign of economic advantage in going out into God's fair country, filling his lungs with oxygen, getting a glimpse of the green fields, recouping the energies that lag, and, in fine, come back invigorated, ready to do more and better work? Is it an economic advantage to die acquiring experience? Do bankers object to having men purchase beef to eat? Why should not these same men purchase oxygen to consume? Is beef a better preserver of life than oxygen? Is it not necessary to go to a slaughter house for beef? Can pure oxygen be had in an ill-smelling shop? Is it not an economic advantage to jump into a swift running automobile and ride out to the storehouse of oxygen for the supply that cannot be obtained otherwise?

* * *

Wise financiers long ago recognized the economic advantage of quick transportation, the liberal dissemination of information, and the results which follow when men and women learn more about each other than they are likely to know if they all stay at home. Are we to forget the fate of China; what befell 400,000,000 of the earth's inhabitants when they elected to isolate themselves and forbade communication? Is there any difference between the "Wall of China" and the wall that surrounds the man who does nothing but go to business and come home at night? His family gets to know him as a dull bore; his neighbors forget that he is on earth.

* * *

Does the economic situation demand that men shall so abuse themselves by all work and no play that they will be hated by those who do not know them excepting as dollar-chasing plodders, and hated more by those who know them best, because they are made into cranks by overwork and lack of fresh air? Must men surrender the love and esteem of all who are in a position to judge of their qualities in order to satisfy the economic situation? Can a man command love and esteem when the smile that cheers wears off, and its place is taken by a pensive drawn map of dull care? Who ever succeeded in keeping dull care as a companion in an automobile for more than the time it took to ride out past the last house and give the weazen-faced beggar one glimpse of Nature?

* * *

When the steering gear develops enough lost motion to annoy the chauffeur, it is pretty nearly time for the owner of a car to call in his family lawyer, make his will, and arrange his earthly affairs. The chauffeur is not easily annoyed; his acquaintance with lost motion, if he is the kind who waits until enough of it developes in the steering gear to annoy him, must be that which would be designated as intimate. Of course the owner of the automobile has one other choice—he can look for a new chauffeur; but before the new chauffeur accustoms himself to lost motion it will be in the path of wisdom to get a new steering gear. True, the old one might be repaired, but it is highly improbable that an ordinary worm and sector, after lost motion develops, can be corrected sufficiently to make it worth while. In any case, the class of steering gear which develops lost motion freely is probably a member of the family which has "defective design" engraved on its crest.

* * *

Judging from the character of the declarations which are being made by the makers of 1911 automobiles, descriptions of which are now rapidly coming out, the newer models are more in the nature of 1910 models refined than outright new designs.

What the Brains of the Industry Say About Finances

Insurance a Death-Bed Speculation

By H. E. COFFIN,
President the Society of Automobile Engineers

Some of the "abstract" thinkers who devote their time to economic problems, not being used to efforts in a large way such as the automobile represents, are endeavoring to refrigerate the further efforts of active workers in the vineyard by means of radiant energy from "cold feet." History was made by the character of men who do things and a series of editorials, as here presented, reflect at first hand what the brains of the industry has to say about financing.

SEVERAL gentlemen have recently aired their views as to the motor car and its effect upon the economic conditions of this country. Mr. J. T. Talbot, Chancellor Day and the Hon. James J. Hill have all taken a shot at the rubber-tired pests which bid fair to swarm over and destroy the face of the country much as did the locusts of Biblical fame. Other views of the situation have been aptly presented by Messrs. Reeves and Briscoe.

It is clear that we do not all agree upon this subject. I believe that we have never all agreed upon any one subject since the world began and the probabilities are that we never will.

The gentlemen of Mr. Hill's persuasion would have us all retrogress to the one-horse chaise in which most of us have gone courting for some centuries past. We are surprised to note this attitude upon the part of a man who owns as many railroads as does Mr. Hill. We will expect next to hear him advocating the stage-coach transportation of a hundred years ago.

Anyway, we think Messrs. Reeves and Briscoe have replied quite pointedly to the remarks of the other gentlemen mentioned. It just occurs to us to say a few words as to a few of the estimated family expenditures for 1910, because we are most of us more or less shocked when we hear mentioned such sums as $360,000,000. Such expressions may roll easily off the tongues of Messrs. Hill, Day and Talbot, but they give most of us a cold shiver. Such figures quicken our pulse, because they represent more money than most of us have ever thought there could be in the world. The statement that this amount will be expended this year in this country for automobiles makes us feel more like winding up our business affairs than did the proximity of Halley's comet. But then, after all, the American citizen is a pretty good thinker. After the first shiver we are still willing to admit that $360,000,000 is quite some money, but are inclined to get out the almanac and see how much we are spending this year for other things. We are all of us apt to ask ourselves whether some of these other things have in the past done or will in the future do us individually or as a nation as much good as will the automobile.

We will spend for intoxicants alone during 1910 $1,800,000,000—five times as much as for motor cars. During 1910 we will spend for tobacco $800,000,000—between two and three times as much as for motor cars. For life insurance we will invest $550,000,000. Now, we can't help believing that a little economy in the money spent for booze and tobacco might be a very good thing for us all and it would not take very much economy upon these items to buy a devil of a lot of automobiles.

H. E. Coffin, President Society of Automobile Engineers

Life insurance is a very good thing—after a man is dead. But unless a man is 86 years of age, and has married a young wife, it is a ten-to-one shot that his family would rather have him spend a thousand dollars for a health-giving and life-prolonging family motor car than to lay up his coin in the form of a cash consolation after he has been planted. It is barely possible, too, that he might so prolong his life as to take care of the insurance policy as well as of tires, gasoline and lubricating oil. All this entirely apart from the question of the pleasures in which the family share—the evening trips into the country, the Sunday rides, and the thousand and one little enjoyments so generally denied to the working man because of his transportation limitations.

It is not to be expected that a lot of us should appreciate just what these things mean. A good many us, like Mr. Hill and Mr. Talbot, can afford to own a private car or two and do a lot of other things beside which the little jobs and pleasures of the man who slaves ten hours a day look mean and insignificant.

Even the figures given above do not give a very good idea as to our yearly expenditures for things other than these four-wheeled "calamity carts." We have mentioned only two or three of those things which might strictly be termed the "unnecessaries" of life. But we do not for a moment place the motor car in this classification. The horseless vehicle, the pleasure and commercial car are with us to stay, just as certainly as are the steam or electric railways and the steamship lines—just as certainly as are the telephone and the telegraph—we could not do without them. The motor car is an indispensable factor in progress.

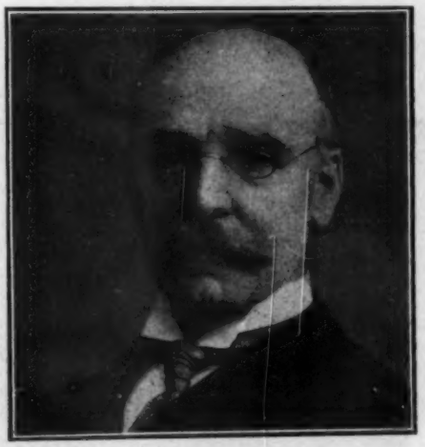
The comment, favorable or unfavorable, of such worthy gentlemen as Messrs. Hill, Day, Talbot, Reeves and Briscoe may strengthen the interest in the motor car and may help to focus the attention of the country generally upon the tremendous growth and importance of the automobile industry. It will all help in the cause of the greatest benefit to our civilization since the days of Fulton and Stevenson—almost since the days of Adam.

Our hats are off to the motor car and to the men whose work has made the motor car possible.

Payroll Goes to Great Army

By THOMAS HENDERSON,
Vice-President Winton Motor Carriage Company

It is difficult to understand how money expended in the purchase of motor cars is a menace to the country's finances. Finance is beneficial to any country only as money is distributed among the industries. Money while stored in banks is serving no good purpose, and when used for gambling on the stock exchange may be doing positive harm; but money expended in the purchase of motor cars is of benefit to many industries, since the



Thomas Henderson, Vice-President Winton Motor Carriage Company

automoble makers' payroll is distributed to a great army of heads of families, who in turn distribute it to the grocer, the butcher, the clothier and the real estate dealer. The automobile manufacturer in the payment of his bills for supplies distributes money to the iron and steel industry, the lumber industry, the leather industry, the rubber industry, and the paint industry, and these industries in turn distribute the money to their employees, who in turn distribute it to the grocer, the butcher, the clothier and the real estate dealer, and in its passage from hand to hand the banks profit. What industry is injured? Is it wrong to give employment to many men and to help them live comfortably? Is it wrong to take money for a product that saves time, decimates distance, takes its purchasers out of doors, gives them service, enjoyment and health that they can secure in no other way? Suppose even that people buy motor cars who can ill afford to do so, what is the result for each such case looked at in its first light—the individual purchaser makes a mistake that cramps him, and money that he does not know how to use properly is put into circulation among the country's workers who do know how to use it; thereby the country's balance is preserved. As a matter of fact, that talk of foolish buying is largely exaggerated. Among our thousands of patrons we fail to recall one who is not amply able to maintain himself and his family without the slightest inconvenience due to his motor car purchase. The motor car industry was practically the only industry giving regular employment to men during the panic of 1907 and the years following, and an industry that can do that is one that the money industries ought to support and not hinder. Incidentally, this campaign against motor car buying seems to be prompted in but one quarter. Might it not be well to investigate that quarter?

Thoughtless Men Can Do Great Harm

By BENJAMIN BRISCOE,
President United States Motor Company

Recent spasmodic statements emanating from prominent men who have attacked the automobile as representing an economic waste, "a menace to the American home," etc., have aroused the indignation of motorists throughout the country, and statements emanating from such prominent men as James J. Hill, Chancellor J. R. Day, of Syracuse University, and Mr. J. T. Talbot, of the National City Bank, New York, call for a reply not because what they say is true, but because of their prominence. Thoughtless men can do a great deal of harm, whether those statements be founded upon facts or fiction.

During 1909 there were made in the United States, approximately, 120,000 automobiles at an approximate valuation of $150,000,000. For 1910 the indications are that there will be sold about 180,000 automobiles for which the valuation will be in the neighborhood of $239,000,000. Separating the 1910 automobiles by price, the following, I think, is a fair approximation:

Automobiles ranging in price from	Number of cars 1910 production	Selling Retailing at
$ 485 to $ 750	16,000	$8,800,000
751 to 1,000	49,000	41,650,000
1,001 to 1,250	58,000	64,000,000
1,251 to 1,600	22,000	33,000,000
1,601 to 2,000	8,000	14,000,000
2,001 to 3,000	15,000	36,000,000
Over 3,000	12,000	42,000,000

To secure a correct idea of the economics involved it is necessary to have these figures before us, because by having them we realize to how great an extent the automobile is coming to be a business vehicle. Generally speaking, all cars up to $1,250 are a very considerable part of the time used for business purposes—that is, as an aid in one way or another in production.

It is safe to say that fully half of the use of the next two classes—that is, cars selling from $1,251 to $2,000 and from $2,001 to $3,000—is devoted to commercial use. This use represents improvement in the facility of production. We may admit for argument's sake that cars selling above $3,000 represent mere enjoyment and health-giving recreation. Many business men, however, use these high-priced automobiles to and from their business at a great saving of time, with consequent enjoyment of their producing value.

Follow the dollar paid for an automobile, and what becomes of it? It is distributed for almost countless purposes. It is wages for working men; it builds their homes; it educates their children; it furnishes employment for almost every class and kind of mechanic; it circulates as lively when used in the automobile business as in any other business except perhaps banking.

The automobile has brought the country nearer the city; it has raised land valuation in nearly all sections of the country; it has cured sick people when medicine did them no good; it has made the strong stronger and the automobile is wiping out more border lines and through the automobile there will be no South, no North, no West, and no East. It is bringing the ruralite and the city folks into closer connections. It has been the cause of making hotel proprietors and merchants in country towns more prosperous and has given employment to thousands.

This, then, is the great industry which these men would lead the country to believe is an "economic waste" and a "menace to the American home." I believe that the intelligent people of this country will conclude that the automobile is worthy.

3,000,000 Automobiles for the Farmer

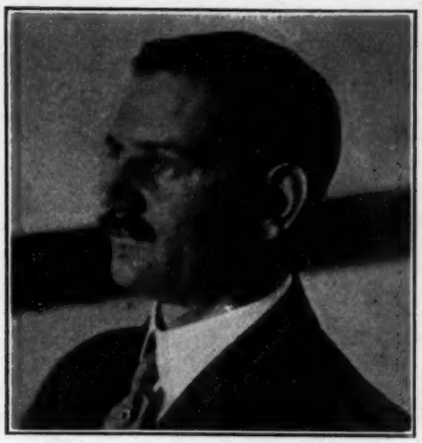
By FRANK BRISCOE,
President Brush Runabout Company

I believe that an understanding of the automobile business and its future will be made easier if all of us will have the courage to act on what we really believe. By taking the attitude that it is too good to be true, we not only fail to get all there is in it during the time of the "ups", but we also get into

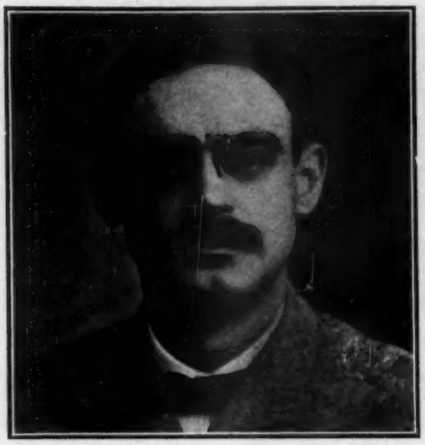
Benjamin Briscoe, President United States Motor Company

Coker F. Clarkson, General Manager Society of Automobile Engineers

S. D. Waldon, Vice-President Packard Motor Car Company



Alfred Reeves, General Manager, Association Licensed Automobile Manufacturers



Frank Briscoe, President Brush Runabout Company

B. F. Everitt, President Metzger Motor Car Company

the habit of thinking that there can be no "downs," as is the case with every other business.

In this topsy-turvy condition, we find it a stigma of shame to have any goods to sell, and it seems to be considered good advertising to tell the public that we have fine cars, but that they will have great trouble in buying one, and that even if they place their order, they probably can't get delivery. This false standard has got to go before the business will be right.

In considering the future of the business, we have two elements—supply and demand. The demand, heretofore, has grown by itself, and we have been struggling to create a supply. We are now getting somewhere within gunshot of the present normal demand. In fact, we now hear mysterious rumors that the supply has caught up with the demand as to certain types of cars in certain places.

The present situation seems to consist of the following elements: The season for buying pleasure cars is now growing old Our bad habit of announcing next year's models nine months ahead has something to do with this marking of seasons.

In view of the vastly increased production plans for next year, we must now turn to the other end of the business, viz., the demand, and study that. There are two kinds of demand—the active and the passive. The active demand is when people insist on buying goods of their own volition. The passive demand is the kind that is created in you when the piano salesman, after camping out on our lawn for three weeks or so, finally cajoles you into a purchase, against your will and expectations.

Heretofore, we have never done much with this passive demand, although in most other lines it is the greatest end of the business. Personally, I shall welcome the time when we begin to need the passive demand. It will eliminate the high-salaried order-takers and substitute for them real salesmen who earn their money. It will prevent the wild craze to start new companies which are alike demoralizing to the trade and damaging to the public. It will also prevent serious over-production, as it will give us some idea of the limits of the demand.

I am absolutely firm in the belief that the ultimate normal demand in the United States will be upwards of 500,000 automobiles per year. We could not sell that many this year, or next year, due to the fact that the selling mechanism is not even complete enough to take full advantage of the active demand.

Before we get through, there will be 3,000,000 automobiles in daily use on farms. The average per capita used in cities is not half what it will be. Ninety per cent. of the physicians, city salesmen, collectors, grocery stores, etc., etc., etc., will have them, because they must. Gasoline excels oats in economy, speed and service. There is no other answer.

Those of us who in the time of plenty have been storing up equipment and organization against the time of need can have nothing but the most optimistic outlook for the future.

The Manufacture of Automobiles Requires Skill

By CHARLES MOORE,
Secretary-Treasurer Security Trust Company, Detroit

The supremacy of Detroit as the automobile manufacturing city of the United States is assured by the number, and particularly by the variety, of the types of machines manufactured here; and also by the production of automobile accessories here.

The location of these manufactories in Detroit was not fortuitous. The wave of manufacturing progress began in Europe after the Franco-German war had settled the status of the German Empire. When the wave reached this country articles requiring skilled labor for their production began to find a location in Detroit, until now more kinds of manufactured articles are produced in and around Detroit than in any other city in the United States.

The future of the automobile seems certain. As cities increase in size—and all the large cities in the whole world are increasing—two forces are at work. Those persons who can afford to live in the country will do so. Those persons who are forced to live in city flats will seek to get out into the open for their pleasure. Therefore, both the suburban estate and the city apartment promote the use of the automobile. The doctor, the architect, the builder and various other professions and occupations not restricted by neighborhood require the automobile. Long-distance deliveries from stores and shops already demand the use of the automobile. The farm motor now in process of development on the Ford 1,200-acre farm at Dearborn promises to do more work in a day than can be done by six men and twelve horses. At least such are the unofficial reports.

People fear that the automobile is a fad, and will disappear like the bicycle. Only a superficial view of the situation suggests a likeness. One difference between the two is that with the bicycle one rode and walked at the same time.

The courage, capital, energy and perseverance of the younger generation of Detroit business men have established the automobile industry in this city; and to-day they are devoting their abilities to strengthening the foundations of the business and putting the structure into shape. Permanency rather than expansion is now the watchword with the established companies.

Automobile Industry's Benefits Widely Diffused

By ALFRED REEVES,
General Manager Association of Licensed Automobile Manufacturers.

It is regrettable that the automobile industry cannot benefit every other line of trade. It is true that it benefits scores of different lines, but the trades not advanced naturally make the motor car the subject of criticism; pessimists now declaring that its death is near at hand, just as they have been making declarations of a similar nature for the past few years.

Never giving a thought to the economical advantages that make it an important factor in our fast-moving life, these pessimists declared at first that the motor car was only a fad; then it was stated to be a luxury for a few; then a necessity for a few; and now, with almost 400,000 motor cars in use, the business of making them has recently been termed by men (who could not have taken more than a casual survey of the situation) to be an extravagance, a waste of capital and representative of everything that is bad.

Scores of trades have benefited by the manufacture and use of the automobile, but leaders in other lines can too easily blame the modern vehicle for any slackening in the demand for their products. Some few highly respected and learned men have undertaken, presumably without investigation, to criticise the automobile business. Their position in many cases is illogical. For example, Vice-President Talbot, of the National City Bank, appearing before the Texas bankers, said that the motor-car manufacture was a woeful waste and extravagance, and indicated that the business was coming to an end. On the other hand, his associate vice-president in the same bank, Mr. H. M. Kilborn, has just organized and heads a company to make automobiles.

People of late may have declined to buy stocks and bonds (the result possibly of what they have learned from recent investigations), so we have a prominent railroad man who blames the automobile for this. Chancellor Day, not to be forgotten, follows in the same footsteps.

The many reasons for the growth of the automobile industry, the fact that it is the greatest advance in the individual transportation line since the days of the Roman chariots, and the further fact that it is almost as important a factor in the economics of the country as the railroads, all prove what grave injustice some of the leading men are doing the industry, which, without the help of Wall Street, without the blare of trumpets, but by hard work on the part of the pioneers, and scientific study, has developed into one of the greatest of American industries. Its use has not cheapened the horse nor decreased its numbers, according to figures recently published. The motor car has simply filled a place and supplied a want which has been open for years. It has enabled people to be transported, and has permitted the transportation of goods with a greater degree of comfort and safety and in faster time, and for that reason is certain to have its use increased.

It is safe to say that fifty different lines of business have been benefited by the manufacture of automobiles, which has distributed millions of dollars every year to other trades, to the real estate field, to hundreds of thousands of laborers, and to the railroads, whose freight shipments of motor cars supplies no mean part of their revenue.

The raw materials used in the manufacture of the motor car include steel, brass, iron, wood, leather, aluminum, glass, cloth, cotton, oil and electrical apparatus.

The trades which have prospered as a result of the industry are far beyond what would appear at first thought. They include machinists, blacksmiths, assemblers, pattern-makers, tool-makers, electrical workers, carpenters, trimmers, finishers, upholsterers, painters, body-builders, mill wrights, tinsmiths.

Those gentlemen, who have undertaken without careful consideration, to warn the public against the automobile industry, are doubtless now aware, through the information which has been supplied in recent articles, of the error which they committed in making statements that were apparently without foundation, and which appears to be only the cry of those who may have been slightly hurt by the advance of the motor-car industry.

Automobile the Triumph of Evolution

By COKER F. CLARKSON,
General Manager Society of Automobile Engineers

The outcry against the automobile, as to its great and increasing popularity, despite the prices at which it sells, is the hoary old cry against progress. That the world needed this improved system of quicker transportation, and was ready for it, has been proven by the immediate and well-nigh universal response to and approval of it. As the telephone, by its practical annihilation of time and distance, has in many substantial respects doubled the hours of every day for the possibilities of practical human achievement, saying nothing of its equal gifts in contribution to human comfort, happiness and manifold enjoyment, so has the automobile greatly increased the possible and even the certain chances for every man who can employ this great new agency, to very often nearly double his day's profit.

The automobile has helped to solve the problem of congestion in cities, and to make possible both cheaper and better residences in the country. In the serious menace of the past few years of the surprising and undesirable growth of city population over country population, the automobile is greatly helping to solve a most important question. It has added new hours of opportunity to every business man's day, contributed to the enjoyment and happiness of his family, and by the creation of a great industry furnished new employment to hundreds of thousands of laborers and many thousands of business men. Instead of encouraging extravagance among those who are not wealthy, it has more often taught those who had not the money to buy a machine, to economize and save to that end.

Why should rich critics deny to those who are not rich the privilege of gaining the means by which they, too, may be able, by comparative economy at the most, to enjoy this last and most remarkable invention for both human need and human comfort? The popular faith in the stories of so many homes being mortgaged to buy automobiles rests most largely, if not entirely, on false assumption—an assumption which has been created doubtless in large part by banking and deposit companies, which naturally believe that the most patriotic and wisest money is that which is kept on deposit, either without interest or at a rate very low. This is not a fitting time to impugn the sense of the large number of American families who have found in the automobile a chance to widen their lives and to increase their joy of living.

One just criticism of our people as a people has been that the average family does not aspire to and gain for itself a life with more of sane and healthful pleasure and enjoyment in it—something to brighten, inspire and gladden it, and joyously make life more worth living. That an automobile can add greatly to the happiness and greatly widen the life of any family able to buy it, no one will deny.

So with the automobile industry, risen to fifth in rank in the American industries, and paying hundreds of millions of dollars for the manufacture of machines—and in the last analysis 90 per cent. of all this money going to the pay of labor—why should college presidents and bankers and railroad presidents be unhappy over the action of many thousands of American families in finding through this great new invention an opportunity for larger happiness and enjoyment?

The automobile is simply a manifestation of the forces of evolution that are working out the world's destiny, and its appearance, in this sense, is no more remarkable than was the advent of discoveries in other lines of endeavor.

The commercial phases of the automobile are practically unlimited. The world wants labor-saving devices. The automobile is one.

From the first the automobile has been the butt of prejudice and doubt. No invention of modern times has had a more bitterly presented antagonism to overcome. The industry was not, however, to be destroyed by the prejudice of men.

The business man who now motors from his residence to his office in town, in place of traveling by train, arrives at his destination with his senses fresh and alert, and with a clear brain to tackle the day's doings. And in the evening, instead of, as under the old régime, reaching home jaded and tired out after a stuffy train journey, he enjoys a motor run which, as a recuperating agency cannot be surpassed, and is fresh for the evening.

Generally speaking, a change has overtaken the entire country as a result of the economical reliable motor car. So much for that. And don't forget that as a result of the existence of the automobile, each year there are spent (aside from the capital and men directly employed) hundreds of millions of dollars; every farmer, hotel-keeper or industrial worker in the nation receiving his portion of expenditures from the use of the hundreds of thousands of automobiles now running in this country.

On the Whole We Are Optimistic

By H. H. NEWSOME,

General Manager McCord Manufacturing Company (Detroit)

There has been a great deal said of late concerning the unprecedented growth of the automobile industry and the "calamity howler" has had his say along with the conservative and the optimistic.

Up to the present time the manufacturers of automobiles have been able to count their sales by the limit of their production and, even now, this may be done with the possible exception of one or two of the medium-priced models. There is, however, every evidence that this condition is fully comprehended by the large manufacturers, as they are now limiting their production to what conservative figuring shows they can sell.

There must be a time in every business when the manufacturing will overtake the sales and we believe that this condition is just being reached in one or two models, and the fact that the industry is reaching a point of stability where the manufacturer cannot go on building regardless of sales, must not be confused with over-production or unwarranted growth. As to the parts manufacturers, their growth is merely a reflection of the automobile builders' growth or, at least, a reflection of their judgment as to demand, because the parts people equip to execute actual orders and, generally speaking, the automobile manufacturer is a positive governor between the parts manufacturer and the automobile buying public.

On the whole we are optimistic of the future and do not agree with the frequently expressed opinion that the growth of the industry is an unhealthy or unnatural one.

Making Preparation to Double Capacity

By B. F. EVERITT,

President Metzger Motor Car Company

In my opinion the automobile business is just started. A canvass of the situation from coast to coast, which has just been completed, points to but one conclusion, i. e., the demand for good automobiles is greater than the present supply, and my company, believing in the situation, is preparing to increase capacity, first, to take care of the 800 orders that lap over present capacity, and again, in view of the positive demand indicated by a systematic call upon the trade. If the incoherent discussion of the economic situation, which is now going on, has any foundation in fact, how are we to account for the pressing demand for automobiles in general, and why are "commercials" now so rapidly filling up the places that once belonged to the realm of the horse?

Not Real Cause for Business Fright

Detroit, June 20 (Special Telegram)—The automobile industry is on a substantial footing because it is the future vehicle business, both in pleasure and commercial cars. It may have its ups and downs, and the tribulations of adjustment to permanent conditions. This is to be expected, and it is not the real cause for business fright.

(Signed) S. D. Waldon, Vice-President,
Packard Motor Car Company.

Detroit Gains Two Factories and Many Buildings

Detroit, June 20—Two new automobile companies have been formed here during the past week. They are the Hupp-Yeates Electric Car Company, $100,000 capital, which will build a new type electric, and a concern headed by Hugo Scherer and F. E. Wadsworth, of the Michigan Steel Boat Company, which will have a capitalization of $250,000 and which will build a small car of more than 20 horsepower; about 100-inch wheelbase, to weigh under 1,900 pounds. This car will sell under $1,000.

The Hupp-Ellis-Rutley Company, a building organization which will undertake the construction work for the Hupp-Yeates Electric Car Company, has also been formed.

Among the other concerns outlined during the week are the following: the Aluminum Solder Company, capital $200,000; the Dominion Stamping Company, capital $100,000, and a large concern to manufacture automobiles at Alpena.

The initial car of the University Motor Car Company, called the 'Varsity, has been finshed. It will be used by the Exalted Ruler of the Elks during the coming conclave. The regular product of this company for next year has been contracted for. The selling price of this car will be $1,300-$1,350.

Buildings to the value of $365,500, to be used for automobile purposes, were projected during the week in Detroit. The chief permits granted to members of the trade authorized the E-M-F Company to construct an addition to cost $125,000, and the buildings of the Anderson Forge Company, which will cost $73,000.

The Metzger Motor Car Company has purchased a large tract of land near Highland Park, where a number of large factory buildings will be erected in the near future. The first of these will be the truck works of the company.

Another concern even larger than the Metzger company is said to be contemplating building a factory in this section of the city.

Buicks and Maxwell Prove Winners

Pittsburg, Ind., June 15—The hill-climb that was held here yesterday was a success; three events being run, two of which were won by Buicks and the other by a Maxwell. The distance was 1-2 mile and from a flying start. The grade was 8 per cent. at the take-off.

In the $750 and under event a Maxwell, driven by Reeser, finished in 1:30; Maxwell, B. O. Benn, 1:39 1-2.

$751 to $1,000—Buick, Gardner, 1:57; Buick, R. R. Penn, :58 2-5; Ford, Bartee, 1:00 3-4; Ford, Ryan, 1:03 3-4; Ford, Grider, 1:05; Ford, Elkenberry, 1:10; Overland, Gardner, 1:14 2-5.

$1,001 to $2,000—Great Western, :48 4-5; Buick, R. R. Penn, :50 1-5; Buick, R. R. Penn, :52 1-5; Buick, A. Dunn, :53 1-5; Ford, Grider, :55 2-5; Ford, Ryan, :59 4-5; Oakland, 1:03; Buick, R. R. Penn, 1:06.

Boston Motorists Fight Overcharge

Boston, June 20—The Automobile Legal Association has inaugurated a campaign whereby it proposes to call a halt on hotels where motorists are charged more than other guests. Circulars have been sent out to all the members asking for confidential information of their experiences. One question asks if any garage has overcharged the motorists, and when and where this has been the case, while another one asks regarding hotels.

Some 200 members of the Massachusetts Real Estate Exchange have planned a two-days motor tour from Boston to Springfield and return for June 28-29. Many of the members own their own cars and with those supplied by Boston dealers it is expected that about 50 machines will be used. Gov. Draper and Mayor Fitzgerald of Boston will go along.

The E-M-F car that is laying out the route for the Munsey tour reached Boston Monday and left next day for the White mountains. Driver Skeggs says the roads so far have been splendid.

S. A. E. Will Soon Issue Complete Specifications

Taking Position Formerly Held by "Mechanical Branch"

The good work of the Mechanical Branch of the Association of Licensed Automobile Manufacturers, which was discontinued for various reasons, has been resumed under the direction of the Society of Automobile Engineers, and the revised specifications of materials and methods will be issued at an early date. Among the matters of moment which will be handled is the proper way to heat-treat the several grades of steel used in automobile work.

ANNOUNCEMENT has just been made at the new offices of the Society of Automobile Engineers, 1451 Broadway, New York City, that the society has completed the preparation of, and will issue shortly to its members exclusively, the most complete list of material specifications ever made for motor car engineering work.

The engineering end is the originating or creating element of the automobile business. The adherence to sound engineering principles of designing and construction spells safety and economy, both to the motor car manufacturer and to the user. Too much stress cannot be laid upon the choice of the proper material for each motor car part and too much care and knowledge cannot be exerted in the treatment of these selected materials. The reliability and the satisfactory performance of the motor car are dependent entirely upon the wisdom which has dictated the design and selected or specified the materials for its construction.

The motor car business has been largely responsible for the great development of certain materials, particularly alloy steels and other metals. The list of material specifications to be published by the Society of Automobile Engineers is not a list of theoretical possibilities, but a list of materials, the qualities of which have been thoroughly demonstrated for motor car uses. These materials are practical in that they can be purchased readily in a commercial way, can be worked economically and are in every respect suited to withstand the severe service to which they are subjected in the motor car. Individuality of design is one thing and should be encouraged. Individuality in specifications for raw materials is largely useless and should be restricted within reasonable limits. Special specifications upon materials mean high prices and a restriction of the delivery of raw materials. Standardization is a necessity of progress.

The Society of Automobile Engineers' specifications were prepared under the advice of Henry Souther, metallurgist, and are accompanied by complete notes and instructions on the method of purchasing, inspecting and handling the materials used in motor car construction, in what condition they should be ordered and how they should be treated, before and after being worked into finished parts.

The work covers such materials as low and high carbon steels, carbon spring steel, screw stock, low and high carbon nickel steel, chrome nickel steel, chrome vanadium steel, chrome vanadium spring steel, silicon spring steel, alloy steel for pressed frames, valve metals, steel castings, gray iron castings, malleable iron, babbitt metals, white brass, phosphor bronze bearing metal, valve bronze, yellow brass, aluminum alloys and all kinds of automobile-engine lubricating oil.

There is an adequate discussion of specific materials suitable for seamless tubing, pressed steel brake drums, sheet steel brake bands, and pressed steel parts of many varieties, forgings, axles, structural parts of any importance whatever, steering arms, steering spindles, levers, connecting rods, crankshafts, main driving gears, nuts, screws, steering connection pins, rocker arm pins, parts called upon to resist wear but not bending strains or severe shocks, propeller shafts, driveshafts, connecting-rod bolts, transmission gears, leaf and spiral springs, crankcases, gearcases and many other parts.

A great deal of space is given to matter on the heat treatment of steels. It has long been known that the proper heat treatment of a high-grade steel is as essential for satisfactory results as its composition.

This work will be issued only to members of the Society of Automobile Engineers, the membership of which is open to every man whose interests are of an automobile engineering nature, and whose qualifications fit him for Society of Automobile Engineers affiliation, regardless of his business connections.

Bridgeport After Open Mufflerites

BRIDGEPORT, CONN., June 20—Following complaints of hundreds of residents of this city, the Board of Police Commissioners has issued orders to Superintendent Eugene Birmingham, that every member of the department arrest violators of the State muffler law. This week the officers will start the crusade, and offenders will receive the maximum penalty in the courts. The complaints come from residents in the outskirts, who claim that passing automobiles with open mufflers make sleep impossible at any hour of the night. Investigation has proven that the greater number of offenders have come to the city from New York, and already the numbers of several have been secured. Section 6 of the general statutes of the State, which refers to the use of mufflers, provides a penalty of a fine of $1, or ten days' imprisonment, or both, for every infraction. The local authorities will strive to secure the jail sentence rather than the fine imposed in order that the custom may be stamped out.

In an interview this afternoon Police Commissioner S. E. F. Hallen said: "We are preparing to enforce the law concerning mufflers. We are going about it quietly, but believe the best results will be secured." The only difficulty which will be encountered during the coming crusade will be with the officers making the arrest.

Winners in Good Roads Tour

Charles Jerome Edwards, referee of the recent National Good Roads Tour from Atlanta to New York, has announced the winners in the various competing classes, as follows:

Division 1 A; cars selling for $800 and under—Hupmobile of N. W. Wallace, Jr., Charlotte, N. C., 20 points penalty.

Division 2 A; cars selling for $801-$1,200—Ford entered and driven by E. M. Willingham, Atlanta, Ga.; clean score.

Division 3 A; cars selling for $1,201-$1,600—Cadillac entered and driven by Dr. K. McColl, Bennettsville, S. C.; Mitchell, entered by James A. Gray, Jr., driven by R. Stowe, Winston-Salem, N. C.; both with clean scores.

Division 4 A; cars selling for $1,601-$2,000—Buick of W. E. Wimpy, driven by P. A. Parmalee, Atlanta, Ga.; 108 points.

Division 5 A; cars selling for $2,001-$3,000—Columbia, entered and driven by Marcellus Rambo, Birmingham, Ala.; Pullman, entered and driven by Norman Gallatin; both with clean scores.

Division 6 A; cars selling for $3,001-$4,000—Pope-Hartford, entered by E. H. Inman, driven by A. L. Almand, Atlanta, Ga.; clean score.

Division 7 A; cars selling for $4,001 and up—Lozier, entered by Asa G. Candler, Jr., driven by F. H. McGill, Jr., Atlanta, Ga.; Pope-Toledo of Edward M. Durant, Atlanta, Ga.; both clean.

New Body Types Shown in Prince Henry Tour

FROM the American builder's point of view, interest in the Third Annual Prince Henry Tour is probably centered in the new body shapes which were brought out there for the first time, and THE AUTOMOBILE, in order to bring this phase of the situation to the attention of makers, undertakes to present these new body situations, utilizing in the process a photograph of three of the cars as they appeared in the parade surrounded by a mass of humanity which so obscured the cars that they had to be much enlarged to bring out the interesting features. The car in the lead in the illustration numbered I T—2637, presents a rectangular front slightly rounding in the upper side, which flares back rather abruptly, and the line of the dash is shown by the second dark band. From this point back the hood overhangs, leaving barely room enough for the seat occupants to squeeze into place, but the really interesting point in this construction is due to the upward sweep of the overhang, around the steering post, which ends in a curve above the diameter of the wheel to a radius somewhat greater than the wheel diameter.

Car No. Y B—4050 has quite a different front. The air must enter through an elongated slit, it being the idea to protect the radiator from the splashing of mud, avoiding at the same time any retardation of the cooling ability of the radiator. In addition to this protective measure for the radiator, the hood sweeps back and beyond the dash line, upward as well as backward, so that while it affords protection to the occupants of the front seat, by a direct process, it also offers the facility of serving as a "dodger." When the air strikes the upward curving flanging it is given a direction which under its force sweeps it upward in a flat sheet, and when it curls back the sheet-like current of air lies above the heads of the occupants of the seat. The third car is a duplicate of the second.

In the Glidden Tour this year practically every car is provided with some sort of splash apron, placed for the purpose of protecting the radiator from mud accumulations. These protective devices, whether or not they are in the form of a leather apron suspended between the two chassis frame members, or as an upward curl of the sod pan, are just as likely to intercept the air en route to the cooling surfaces of the radiator as will be true of the form of construction presented in the Y B —4050 car as here presented.

There were 121 cars at the start of the Prince Henry Tour, 87 of which finished. The entries showed a wide variation in structural practices. Wheels, for illustration, were diversified, some of them being of steel, others of wood, and a considerable number used wire spokes. The Rudge-Withworth special type of wheel was used on the Austrian Daimlers and the Vauxhall (English). In the preliminary examination it is highly improbable that the formalities were complied with with that precision which inspires confidence. The Daimler (Austrian) took first honors, and the second and third places also went to cars of the same make. The Opel entrant came in fourth, and the big Benz car had fifth place. The trophy was put up for three years, and the manufacturer who wins it twice becomes the owner. Failing in this, the rule provided for drawing lots for the possession of the cup at the end of three years. This is the third tour, and neither the Horch nor the Opel, winners in 1908 and 1909, was in front. Adam Wilhelm's Adler and Fritz Erle's Benz are the cars shown. Bore and stroke of contestants follow:

Adler, six 4.1 x 5.9, two 3.3 x 5.1; Benz, seven 4.5 x 6.9, one 4.7 x 5.7, one 4.7 x 5.3; four 4.1 x 6.5; Bergmann, six 4.1 x 6.5, two 3.3 x 5.7; Brennabor, four 3.5 x 5.9; C. Benz Sons, one 3.3 x 4.5; Berliet, three 4.7 x 5.5; Bugatti, one 3.9 x 6.3; Daimler (Austrian), ten 4.1 x 6.5; Deutz, two 4.3 x 6.3, two 3.7 x 6.1; Dixi, one 3.4 x 4.3, three 2.95 x 4.7; Delaunay-Belleville (six-cylinder), one 3.3 x 4.7; Dux, two 2.95 x 4.7; Fiat, four 3.7 x 6.1; Gaggenau, seven 4.3 x 6.5; Hansa, 4.3 x 5.1; Lux, one 3.5 x 4.7; Mathis, four 3.1 x 5.5; Mercedes, eight 3.7 x 6.1, one 3.5 x 5 5; Opel, six 4.5 x 6.9, one 4.7 x 5.5, one 4.3 x 6.3, one 4.3 x 5.9, four 3.9 x 6.3, five 3.9 x 6.1, one 3.3 x 5.7, one 3.1 x 5.1; Protos, five 4.3 x 4.7; Presto two 4.3 x 6.5; Puch, two 3.9 x 6.3; Raf, one 4.5 x 6.3, one 4.3 x 6.3, two 4.3 x 5.5; Stoewer, four 3.1 x 5.5; Vauxhall, three 3.5 x 4.7, two 3.3 x 4.5.

To Promote the Cause of Good Roads

THE movement for good roads received its first great impetus from a private source. Colonel Pope, the pioneer bicycle manufacturer, has often been referred to as "The Father of Good Roads." He was quick to see the commercial importance, not to himself alone but to the whole country, of good roads. This participation by a business corporation in such a movement has a counterpart to-day in the efforts of a manufacturer of auto tires. The B. F. Goodrich Company, of Akron, Ohio, is setting out on a project that will synthetize the rural sections of States, identify the interests of country and city, and unite the interest of a large section of the influential public, namely, the automobile owner, on the subject of highway improvement.

Plate With Explanatory Symbols

This company is placing a sign-post at every four miles along the main highway from Cleveland to Buffalo, across to Albany, and down to New York. From New York the line of posts will run out to Philadelphia, over Long Island, and to Atlantic City and Lakewood. Farther east the posts will be put up through Connecticut to Boston, and then into the mountain resort regions of New England. After this the work will be farther extended.

The 12-foot, 4 x 4-inch post is thoroughly creosoted to make it weatherproof. On the top is the round metal sign plate, 2 feet in diameter. Through the center of this plate are drawn two arrow blades with spaces for the names of three towns—the next town, the next largest town, and the ultimate destination. Opposite each name are the distances, carefully reckoned to the fraction of a mile. Projecting out from the disc and pointing in the remaining directions are two other blades. These are brightly painted in contrasting colors so that the information is easily read by the traveler as he sits in his conveyance.

Opposite the name of a town is a symbol indicating the kind of repair, or relief, there is to be obtained. Lower down on the post is a plate bearing a copy of all the symbols together with an explanation of each one. For example, two rings, one enclosed within the other, indicate "Goodrich Tire Station"; a large solid black circle means "Gasoline Supply Station"; a hammer and wrench crossed, call attention to a "Reliable Repair Shop"; besides these are the proper designations for "Danger Crossing," "Curve Danger" and "Go Slow." In locating the posts a series of topographical maps from the United States Geological Survey has been used.

This entire scheme recognizes the new obligation of the manufacturer who makes a product that is identified so closely with the economic life of the public.

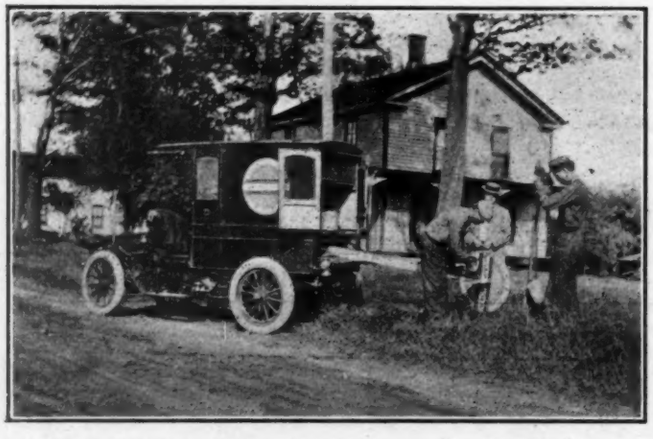
"The Vanadium" Formally Opened

In the heart of the Pennsylvania hills, at Cambridge Springs, the Vanadium, which was formerly known as the Hotel Rider, has been reopened under new ownership and with an entirely new policy of administration. The hotel is known as the "Carlsbad of America" on account of its wealth of medicinal springs and magnificent facilities for using them, is beautifully situated and is thoroughly equipped.

The management is under the personal supervision of Messrs. Matthews, Quinn and O'Loughlin, formerly of the Waldorf-Astoria.

Among its other attractions the hotel has a fully equipped garage where supplies may be obtained and minor repairs made. The most notable new feature of the hotel is the medical staff and physical instructors that have been added.

As a resort for touring automobilists the hotel is well situated and every facility for enjoyment and comfort of such parties has been provided by the management.



Attaching the Arrow Blades to the Disc

Nailing on the Timber Cross Piece

Motor Notes from Michigan's Capital

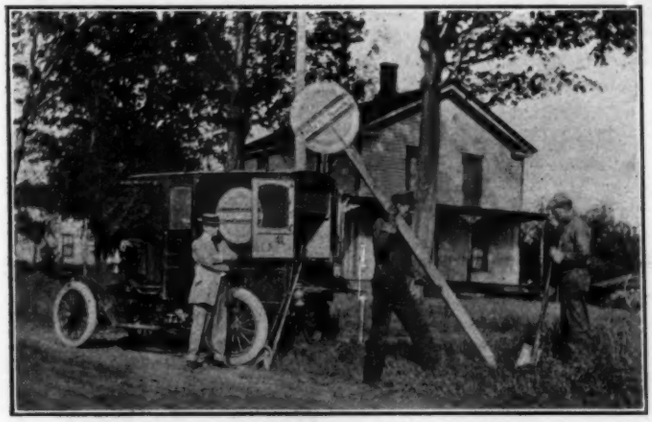
LANSING, MICH., Jun 20—J. Edward Roe, cashier of the Lansing State Savings Bank, has been elected secretary of the Reo Company to succeed Edward F. Peer, resigned. Mr. Roe will assume his new duties September 1. Donald E. Bates has been elected treasurer of the company.

The fourth annual orphans' day of the Grand Rapids Automobile Club was held June 15, and 200 inmates of the Blodgett Home for Children and St. John's Orphan Asylum were given an outing.

Incorporation papers of the Alpena Motor Car Company have been forwarded to the Secretary of State. The capital is $450,000, of which $300,000 is common and $150,000 preferred stock. The officers are: President, D. D. Hanover; vice-president, William Krebs; secretary and treasurer, William Roberson. The company will manufacture a four-cylinder, 35-horsepower, 112-inch wheelbase automobile, to sell for $1,450. To secure the industry, the people of Alpena gave a bonus of $50,000.

Velie Service Held Defective

MILWAUKEE, June 20—Judge W. J. Turner, in the Milwaukee Circuit Court, has dismissed twenty cases in the suit of the Velie Motor Vehicle Company, of Moline, Ill., against twenty-five automobile companies operating in Wisconsin under the name of the Association of Licensed Automobile Manufacturers. Of the five other companies, four were held to have been served and one was released. The four companies held are the Pope Manufacturing Company, the Locomobile Company, the Chalmers-Detroit Motor Car Company and the Pierce-Arrow Motor Car Company. The Peerless Company was released. The Velie Motor Vehicle Company, in its suit alleged that the defendants operated under an organization for restraint of trade and damages to the extent of $500,000 were demanded.



The Completed Post Ready for Erection

On the ground that they were foreign corporations, doing business in other states, and have no authorized agents in Wisconsin, the defendant companies had filed motions asking that the complaint be dismissed. They claimed that the dealers who represent them buy their goods in the cities where the automobiles are manufactured, the companies delivering them free-on-board at the shipping points. When paying for the goods, the money was received by the companies at the place of manufacture.

Service had been rendered upon the defendants through their alleged agents in Milwaukee, but these dealers claimed that they were not agents, that they were working for themselves, buying and selling as in any other business.

Two Weeks' Tour on Boston Streets

BOSTON, June 20—The E-M-F 30, which has been making a reliability and durability test through the streets of Boston, was stopped at 11 this morning, just two weeks from the time Charles J. Glidden gave the crank a twirl in front of the State House. When the car stopped, 3,382 miles had been covered. The gear shifts totaled 8,072, while the brakes had been applied 5,712 times. The clutch had been thrown 10,146 times.

Nailing the Explanatory Plate to the Post

Detroit Exposition Opens Doors

DETROIT, June 21—The Detroit Industrial Exposition is in full blast, having been opened on electrical signal by President Taft. The show ranks high in its class and from an automobile viewpoint is particularly impressive. Numerous 1911 models are exhibited. The show is being held in the old Wayne Pavilion, which has been much enlarged and improved for the purpose. It will continue until July 6. The following concerns are represented:

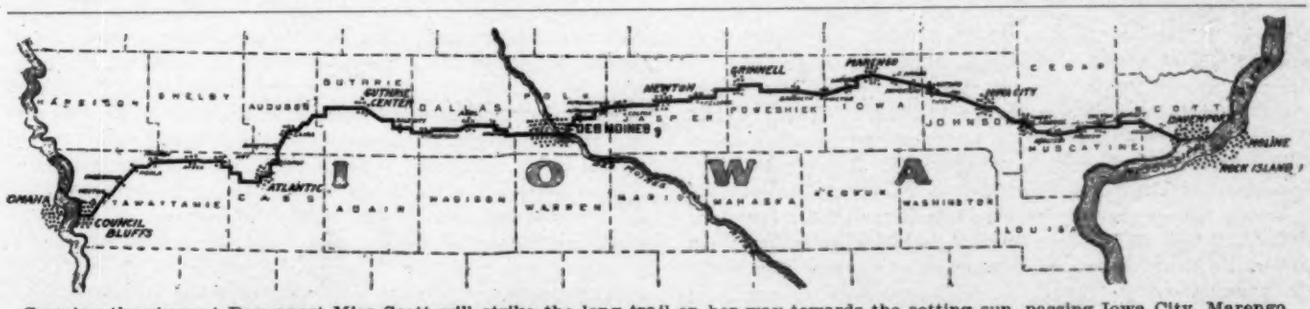
Brush Runabout Company, Brush; Cadillac Motor Car Company, Cadillac; Carhartt Automobile Corporation, Carhartt; Chalmers Motor Company, Chalmers; Everitt-Metzger-Flanders Company, E-M-F, Flanders 20; Ford Motor Company, Ford; Hudson Motor Car Company, Hudson; Hupp Motor Car Company, Hupmobile; Metzger Motor Car Company, Everitt 30; Paige-Detroit Motor Car Company, Paige-Detroit; Regal Motor Car Company, Regal; Warren Motor Company, Warren-Detroit; Anderson Carriage Company, Detroit Electric; American Motor Truck Company, American Truck; Beyster-Detroit Motor Car Company, Beyster-Detroit delivery wagon; Grabowsky Power Wagon Company, Grabowsky trucks; Stuart Commercial Car Company, Stuart trucks.

The accessory makers are:

Aluminum Castings Company, Anderson Forge & Machine Company, American Lubricator Company, American Motor Castings Company, American Motor Washer Company, Auto Marine Appliance Company, Auto Parts Mfg. Co., Briscoe Mfg. Co., Corcoran-Detroit Lamp Company, Detroit Carbureter Company, Detroit Lubricator Company, Detroit Motor Castings Company, Detroit Radiator Company, Detroit Roller Bearing Company, Detroit Screw Works, Detroit Steel Products Company, Detroit Steering Wheel & Windshield Company, Diamond Mfg. Co., Dodge Bros., Edmunds & Jones Mfg. Co., Fisher Body Company, Gemmer Mfg. Co., Gray Motor Company, Griswold Motor & Body Company, Hall Lamp Company, Hayes Mfg. Co., Hydraulic Oil Storage Company, Kelsey-Herbert Company, Kelsey Wheel Company, McCord Mfg. Co., Michigan Lubricator Company, Seitz Auto & Transmission Company, Russell Motor Axle Company, Timken-Detroit Axle Company, C. R. Wilson Body Company.

Flanders "20" Makes Progress

The Flanders "20" car, en route from Quebec to Mexico City, is now well on its way across the Mississippi Valley. The tour from Quebec to Detroit proved particularly arduous, but the car came through unscathed. Considerable progress westward and southward has been made during the past week, the course lying through Toledo, Fort Wayne, Indianapolis and Terre Haute.



Crossing the river at Davenport Miss Scott will strike the long trail on her way towards the setting sun, passing Iowa City, Marengo, Grinnell, Newton, Des Moines, and from there on, as the map here shows, landing in Council Bluffs. The Overland will be given a test over all kinds of roads—the run will extend to the coast.

The Contest Rules of 1910

By HOWARD E. COFFIN, Chairman of the General Rules Committee of the Manufacturers' Contest Association

THE 1910 rules governing motor car contests in this country provide classes in which may be entered anything from the "one-lunger" to the biggest six- or eight-cylinder road locomotive that has been or can be built. They provide classes wherein can be entered *bona fide* stock cars and yet other classes for cars of special construction built for racing only.

An especial effort has been made to restrict "stock car" events to those cars which are really "stock" in accordance with the meaning of this term in the mind of the public.

The 1910 definition of a stock car is as follows: "A motor car, the complete description of which, upon the official blank provided for the purpose, has been filed with the main office of the technical committee of the contest board at least thirty days prior to the date of the contest entered, the quantity production of which bears to the total yearly production of its manufacturer the ratio set forth in the following table, and which is on sale through the regular selling representatives of the manufacturer."

At the discretion of the contest board, any competitor may be required to file a bond of $5,000 that the entry made by him is a *bona fide* stock car within the meaning of this definition:

Total Output	Percentage	Number of Same Model
10,000 cars or more	4.5% equalling	450 cars minimum
8,000 cars to 9,999	5.0% equalling	400 cars minimum
6,000 cars to 7,999	6.0% equalling	360 cars minimum
4,000 cars to 5,999	7.0% equalling	280 cars minimum
2,000 cars to 3,999	8.0% equalling	160 cars minimum
1,000 cars to 1,999	9.0% equalling	90 cars minimum
500 cars to 999	10.0% equalling	50 cars minimum
200 cars to 499	16.0% equalling	40 cars minimum
100 cars to 249	30.0% equalling	30 cars minimum
50 cars to 99	50.0% equalling	25 cars minimum

Percentages are calculated on actual total output. For example, if the total annual output of a manufacturer is 2500 cars, at least 8 per cent. of said output, or 200 cars, must be of the same model in order to constitute such model a stock car.

During past seasons the records of the technical committees have shown many evasions of the stock car rule. These unsatisfactory conditions led to the formation about a year and a half ago of the Manufacturers' Contest Association, embracing within its membership nearly all the leading motor car makers.

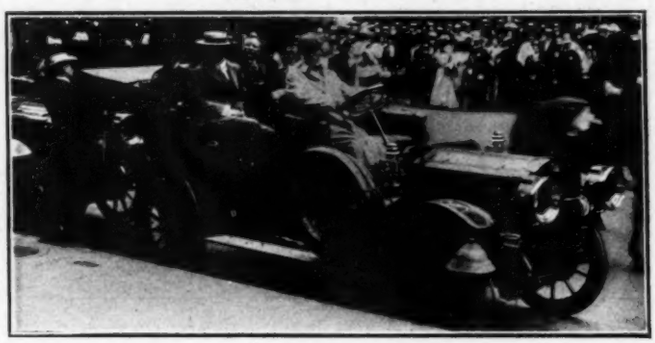
As showing the scope and purpose of the organization, section 8 of the by-laws is quoted herewith in its entirety:

"The special rules and classification committee shall prepare classifications and formulæ applying to all contests. It shall submit on or before Sept. 1 of each year to the contest board, or its successors, or a similar board, recommendations as a basis for creating general contest rules to govern for the succeeding year."

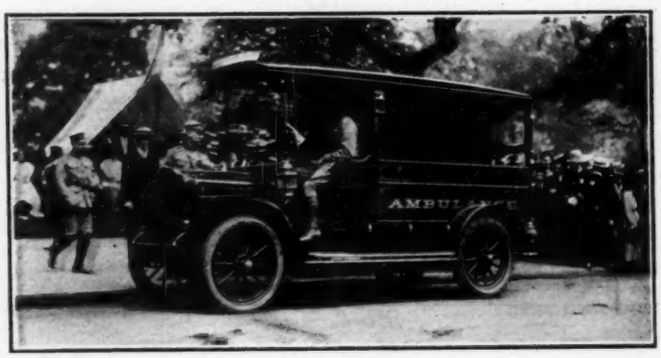
It will be seen that the rules and conditions governing motor car contests have been evolved by a co-operative action upon the part of the representative motor car manufacturers of America.

The general rules committee, which has adopted the formulæ and classifications governing stock car and other contests, is composed of representatives of the following concerns: Chalmers Motor Company, Apperson Brothers Automobile Company, Buick Motor Company, Hudson Motor Car Company, Dayton Motor Car Company, E-M-F Company, Fiat Automobile Company, Nordyke & Marmon Company, H. H. Franklin Automobile Company, Knox Automobile Company, Locomobile Company of America, Lozier Motor Company, Maxwell-Briscoe Motor Company, Mitchell-Lewis Motor Company, National Motor Vehicle Company, Pierce-Arrow Motor Car Company, Renault-Frères selling branch, F. B. Stearns Company, E. R. Thomas Motor Company and The White Company.

Among the membership of the Manufacturers' Contest Association are the names of the following well-known makers: Apperson Brothers Automobile Company, American Locomotive Company, American Motor Car Company, Buick Motor Company, Brush Runabout Company, Benz Auto Import Company of America, Chalmers Motor Company, Columbia Motor Car Company, Dayton Motor Car Company, Everitt-Metzger-Flanders Company, Fiat Automobile Company, H. H. Franklin Manufacturing Company, Hol-Tan Company, Hudson Motor Car Company, Hupp Motor Car Company, Knox Automobile Company, Locomobile Company of America, Lozier Motor Company, Maxwell-Briscoe Motor Company, Mora Company, Marquette Motor Company, Mitchell-Lewis Motor Company, Matheson Automobile Company, Moline Automobile Company, Metzger Motor Car Company, National Motor Vehicle Company, Nordyke & Marmon Company, Olds Motor Works, Oakland Motor Car Company, Peerless Motor Car Company, Premier Motor Manufacturing Company, Pierce-Arrow Motor Car Company, Palmer & Singer Manufacturing Company, Renault Frères selling branch, Reo Motor Car Company, Selden Motor Vehicle Company, F. B. Stearns Company, E. R. Thomas Motor Company, The White Company and The Willys-Overland Company.



Col. Roosevelt, Theodore Roosevelt, Jr., and Miss Alexander Leaving Douglas Robinson's House in the White Steamer



White Steamer Ambulance Used by the National Volunteer Aid Association During the Reception to Col. Roosevelt in New York

So flagrant did the abuse of the spirit of the stock car rule become in the contests of 1909 that the public naturally began to be extremely skeptical upon all matters touching stock cars and stock car competitions. That this feeling upon the part of the public (the owners and prospective owners of thousands of motor cars) did and does exist has been clearly proven by the many inquiries upon such matters which have been registered with the several technical motor car papers of the country.

Upon the contest board of the A. A. A. falls the administration of those rules which have been accepted by the manufacturers as for the best interests of the motor car industry as a whole. Motor car racing, if followed consistently by the manufacturer, is entirely too expensive to make it a matter of sport. If it is to be a matter of business, a source of publicity and a means of demonstrating to the buying public those qualities of motor car construction and endurance which must recommend his product

for the every-day use of the purchaser, then certainly there can be no objection to the introduction into motor car contest affairs those same principles of honest business administration which the manufacturer and the public would expect to maintain in any other line involving similar expenditure of money and effort.

Moreover, the maker who elects to obtain through stock car racing and contest work those important advantages in an engineering, publicity and selling way, and who goes at it honestly, making entry of his *bona fide* stock product, cannot be blamed for insisting upon an impartial administration of those rules.

In stock chassis racing it is recognized that certain changes in equipment and arrangement of parts must be permitted for considerations of the safety both of occupants and spectators.

That the contest board might be given the necessary authority in the administration and enforcement of these rules, the following three rules were drafted:

First: It is the intention of the rules relating to stock car and stock chassis competitions that such competitions shall be restricted to those cars identical in specification, materials, and design with the manufacturer's product which is manufactured in quantity and is offered for sale and sold in a *bona fide* manner to the public through the regular agencies of the manufacturer.

E-M-F Pathfinder on the Road Between Somerville and West Point

E-M-F Pathfinder Crossing Bridge Over Gorge at West Point. The Car Is Well on Its Way Toward Its Goal

Second: In the event of evasion on the part of entrants of the spirit of the "stock car" or "stock chassis" definition concerning points not definitely stated in these rules, the contest board shall have full power to render such decision as it may deem for the welfare of the sport and industry.

Third: In any case where it may be necessary to establish the status of any car alleged to be a stock car under the definition contained in these rules, the technical committee of the contest board shall have the right to visit the factory of the manufacturer of such car, who shall be required to submit to the committee such evidence as it may require to verify the allegation on which the "stock" status of the car is based.

The technical committee shall also have power to take possession of any competing car, and make such examination thereof as may be necessary to establish its "stock" status.

Results of "Montauk Light or Bust" Run

With sixteen clean scores out of an entry list of thirty-seven, the "Montauk Light or Bust" two-day endurance run around Long Island of the Motor Contest Association was finished last Wednesday. The course aggregated 380 miles, and nearly fifty miles of the first day's run was through the Montauk Point badlands, as hard a bit of going as can be found in Long Island.

Four out of the five Buicks that competed finished the run with perfect scores, while two Mitchells out of three avoided penalization. The run was accomplished under favorable conditions and was successful in every way. W. J. Morgan, who has retired as head of the association, will be succeeded by E. L. Ferguson. The summary of the results:

Division 1A—$800 and under—

No.	Car.	Entrant.	Driver.	Penalty.
24	Hupmobile	F. L. C. Martin Auto Co.	Elmer D. Cutting	0
43	Hupmobile	F. L. C. Martin Auto Co.	R. E. Gillam	1010

Division 2A—$801 to $1,200—

No.	Car.	Entrant.	Driver.	Penalty.
20	Mitchell	Mitchell M. Co. (Bklyn)	D. M. Hasbrouck	0
32	Ford	Ford Motor Co.	W. B. Young	0
37	Buick	Buick Motor Co.	Charles Jones	0
31	Ford	Bishop, McCormick & Bishop.	McCormick	38

Division 3A—$1,201 to $1,600—

No.	Car.	Entrant.	Driver.	Penalty.
19	Mitchell	Wm. Simonson (Mineola)	Wm. Simonson	0
25	Chalmers	Continental Tire Co.	E. Miles Welch	118
44	Studebaker E-M-F	Studebaker Bros. Co.	E. A. Taylor	0
45	Staver	Short & Wright	C. S. Cheney	0
11	Regal	Regal-Detroit Auto Co.	George Ainslee	1000

Division 4A—$1,601 to $2,000—

No.	Car.	Entrant.	Driver.	Penalty.
36	Buick	Dr. Wm. H. Nafis	Dr. Wm. H. Nafis	0
38	Buick	Buick Motor Co.	W. Davenport	0
39	Buick	Buick Motor Co.	Phil. Hines	0
40	Buick	Buick Motor Co.	Frank Remson	8
35	Westcott	Dunlop-Taylor Co.	Thomas Wilson	79
1	Pierce Racine	Samuel W. Fromm	W. A. Wells	1000
2	Cadillac	Detroit-Cadillac M. Co. Award held up	L. R. Burne	1000
16	Auburn	LaDue-Carmer Motor Co.	Herbert F. Earl	1,000
34	Elmore	John L. Gwyer, Jr.	J. L. Gwyer, Jr.	1048

Division 5A—$2,001 to $3,000—

No.	Car.	Entrant.	Driver.	Penalty.
4	Haynes	W. E. Shuttleworth	W. E. Shuttleworth	0
18	Mitchell	Mitchell M. Co. of N. Y.	O. R. DeLamater	9
5	Mercer	Mercer Auto Co.	Joseph Trehou	1000
12	Franklin	Franklin Auto Co.	C. J. Hickman	1000
27	Selden	Cloud-Marts Auto Co.	Richard Carter	4

Division 6A—$3,001 to $4,000—

No.	Car.	Entrant.	Driver.	Penalty.
6	Palmer-Singer	Fred J. Titus	Fred J. Titus	0
13	Franklin	Franklin Auto Co.	Paul Harvey	0
17	Matheson	Matheson Auto Co.	Neil Whalen	0
41	Welch-Detroit	Buick Motor Co.	C. V. Searing	0
29	Knox	Knox Automobile Co.	H. K. Sutherland	15
3	Palmer-Singer	Palmer-Singer Mfg. Co.	A. P. Palmer	129
28	Palmer-Singer	R. D. Apperson	A. N. Henderson	180
42	C. G. V.	C. G. V. Import Co.	Arthur Coombs	356

Division 7A—$4,000 and over—

No.	Car.	Entrant.	Driver.	Penalty.
30	Amplex	Henry F. Siebert	Harold W. Sisop	0
8	Zust	American Zust Motor Co.	V. P. Pisani	30
10	Amplex	S. J. Wise & Co.	Walter Jones	1000
15	Fiat	Hugo Ricca	Peter Smith	1000
25	American	American Auto Co.	Earle A. Cryne	1034

CAUSES OF PENALIZATIONS

Division 1A—Hupmobile, No. 43, for motor stop, 9 for replenishments, 1000 for dropping out.

Division 2A—Ford, No. 31, 38 for replacing balls in bearing.

Division 3A—Chalmers, No. 25, 118 for stalled motor and time lost from car being stuck in the mud. Regal, No. 11, 1000 for rear differential trouble, causing withdrawal.

Division 4A—Buick, No. 40, 8 points for lateness. Westcott, No. 35, 1 for motor stop, 78 for lateness. Pierce-Racine, No. 1, 1000 for withdrawing on second day. Auburn, No. 16, 1000 for withdrawing by reason of broken axle. Elmore, No. 34, 40 for gearbox adjustments, 2 for motor stops, 6 for replenishments and 1000 for withdrawal.

Division 5A—Selden, No. 27, 1 for cut fan belt, 3 for taking on water, 4 for cleaning lubricator belt. Mercer, No. 5, 1000 for failing to check in at noon control and withdrawing; continued as noncontestant. Franklin, No. 12, 1000 for withdrawal due to magneto trouble.

Division 6A—Knox, No. 29, 15 for adjustments and replacing plugs. Palmer-Singer, No. 3, 6 for replenishments, 123 for lateness. Palmer-Singer, No. 28, 2 for stalling motor, 178 for lateness. C. G. V., No. 42, 1 for motor stop, 47 for engine repairs; 309 for lateness.

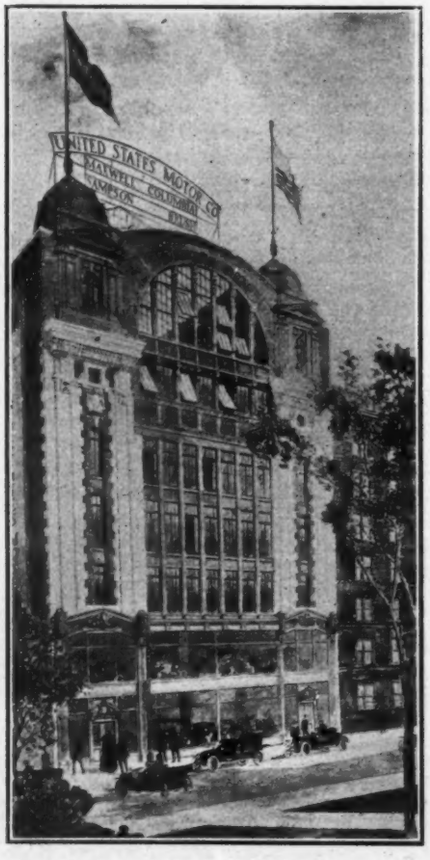
Division 7A—Zust, No. 8, 30 for removing carbon from igniters. Amplex, No. 10, 1000 for failure to check in at first control. Fiat, No. 15, 1000 for withdrawal on account of accident. American, No. 25, 34 for replacing spark plugs, 1000 for withdrawal on account of fire.

In the Realm of the Makers

Henry K. Holsman, formerly president and engineer of the Holsman Automobile Company, is now with the Independent Harvester Company, and the company is equipping factory No. 2 for the manufacture of a line of automobiles, motors, etc., under the Holsman patents.

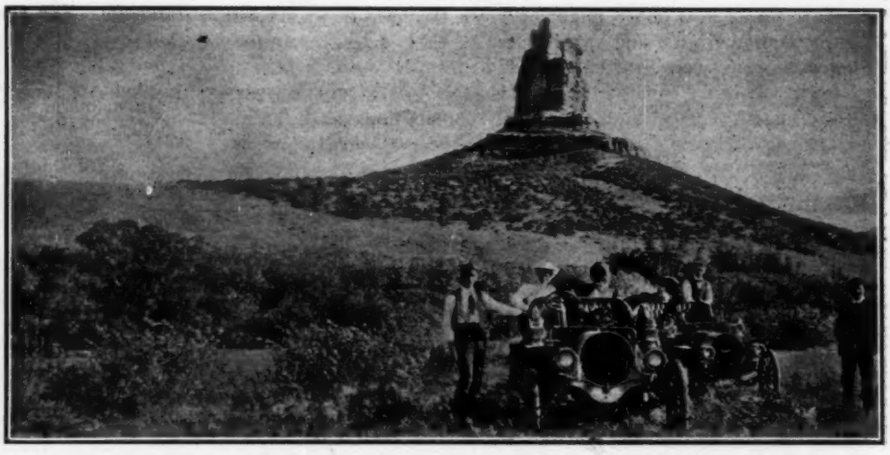
President Benjamin Briscoe has announced that the Pittsfield plant of the Alden Sampson Mfg. Co. will be doubled in capacity. Ground will soon be broken for a building 170 by 70 feet, and an additional story is to be erected on the present main building, which is 85 by 100 feet. A new forge and blacksmith shop 60 by 100 feet and a paint and testing room 40 by 150 feet will also be erected immediately. An investment of $125,000 for new machine tools has been made, and a new building to be used as an engineering department, drafting and testing laboratory will be added to the plant.

Announcement is made that the Inter-State Automobile Company of Muncie, Ind., has been granted a license under Selden Patent No. 549,160. The Inter-State Company markets cars selling at $1,750 and at $2,000. Thomas F. Hart is president and general manager. The other officers are J. M. Maring, vice-president, and Otto Holdren, secretary-treasurer.



New $1,000,000 building of the United States Motor Company in New York City

The latest addition to The White Company's line of steam and gasoline cars and motor trucks is a new type of closed car known as the White gasoline coupé. The steering wheel and operating levers are located within the closed body and the operator is thus afforded protection from rain and cold.



Franklin Car at Chimney Rock, 27 miles from Laramie, Wyo., 8,000 ft. above sea level

Henry F. Tully, a certified public accountant of Detroit, has joined the office force of the Clark Power Wagon Company, at Lansing, Mich.

Frank Dunnell has left the Ford factory to become assistant Ford manager at Atlanta, Ga. E. T. Backus, of Detroit, has joined the Ford branch at Houston, Texas.

Bert Morehead, Detroit branch manager for the B. F. Goodrich Company, is following the Glidden tour's progress by train to look after the interests of Goodrich tires.

C. E. Wheeler, with the H. H. Franklin Mfg. Co. for a number of years, is now with the Owen Motor Car Company, of Detroit, and will cover the territory east of Buffalo.

Sidney J. Stern, formerly New York City representative of the Automobile Trade Directory, has been promoted to the management of the Detroit office, just vacated by the resignation of C. K. Brauns.

Lambert Hollander, of the firm of Gray & Davis, makers of automobile lamps at Amesbury, Mass., has sold his interest in the concern to S. Preston Moses, of Boston. Mr. Hollander has retired from business.

C. K. Brauns, formerly representative of the Automobile Trade Directory, located in Detroit, has become vice-president and sales manager of the Radle-Clark Sales Company, which has contracted for the entire output of the Clark power wagons.

The Fal Motor Company of Chicago has increased its capital stock from $200,000 to $500,000. The officers of the company remain the same. The Fal-Car is now in its second year.

James F. Baines, service manager of the Packard Motor Car Company, died at his home in Detroit, last Sunday afternoon, aged 35. His death was very sudden, being caused, it is believed, by ptomaine poisoning.

Joseph N. Spining, formerly with the Cincinnati Tire Company, Cincinnati, O., has severed his connection with that firm.

John W. McCrea, formerly with the Winton Motor Carriage Company, has assumed the office of secretary in charge of sales with the Standard Sales Company, of Detroit, which firm deals largely in parts for automobile manufacturers.

F. O. Durfee has joined the sales force of the Owen Motor Car Company of Detroit, and will be in charge of the Southern and Southwestern territory, including Florida, Tennessee, Alabama, Arkansas, Mississippi, New Mexico, Texas and Oklahoma.

Captain William Mitchell Lewis, president of the Mitchell-Lewis Motor Company, of Racine, Wis., and his family, returned recently from an automobile trip from Paris to Venice. Captain Lewis used a Mitchell six-cylinder car in making the trip. The whole party returned well, and declared the tour was a perfect success.

Twenty-five automobile owners of Ellwood City, Pa., have formed the Ellwood City Automobile Club with these officers: President, A. C. Frey; vice-president C. F. Buchanan; secretary D. H. Muchaly; treasurer, J. W. Offutt. The club will wage an active campaign for good roads and will act in conjunction with the Lawrence County Automobile Club, of New Castle, Pa., which has offered a prize for the best piece of road made in that county this year.

Fred R. Leuscher, at one time having a string of about fifty playhouses, has practically retired from the theatrical business to engage in the automobile business. He has become Rochester, N. Y., representative of Thomas B. Jeffery & Company, manufacturers of the Rambler cars, and has opened a garage at 745 Park avenue.

The tie for the first prize in the recent big Premier run from Philadelphia to Cape May between Charles H. Clinton, of Philadelphia, and M. S. Shakespeare, of Haverford, was decided by the toss of a coin, the former guessing the right side.

Kelly-Springfield Trophy for winner in Division 1 Class C, in Norristown Club's Scranton Run

The Hartford Auto Parts Company, Hartford, Conn., is opening a branch office in Detroit, Mich. This concern has added a complete line of cone clutches to its product. The success with this clutch is, no doubt, due partly to the fact that it is furnished with a double set of Universal joints of the trunnion block type. F. L. Martin, secretary and sales manager, will be in charge of the office for the next two or three months with temporary headquarters at the Pontchartrain Hotel.

E. D. Dunning, formerly with the Atwater-Kent Company, has taken hold of the Ohio car end of the G. Hilton Gantert Company's Philadelphia agency business, Mr. Gantert looking after the company's Stearns interests.

F. D. Dorman, formerly secretary of the Maxwell-Briscoe Motor Company, and more recently secretary of the United States Motor Company, was elected vice-president and general manager of the Maxwell-Briscoe Motor Company, with headquarters at Tarrytown, New York.

J. B. Hulett has resigned as sales manager for the Robertson Motor Car Company of Minneapolis, to become Western sales manager for the Owen Motor Car Company, of Detroit. He hopes to establish the Western headquarters of the company in Minneapolis.

Agency and Garage News

J. B. McCarthy, for six years with the English Daimler Company and seven years a member of the auto colony in New York, has bought the Fulton Garage on Auburn avenue, Atlanta.

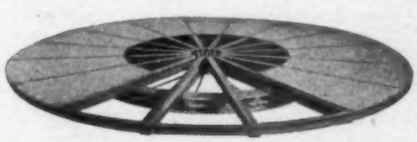
Collins & Company have taken the State of Michigan agency for the Marmon car, and are temporarily located at 732 Woodward avenue, Detroit. The Clark power wagon will also be handled, as well as several other makes to be announced later.

The North Jersey Motor Car Company has removed from 27 Washington place, East Orange, to 16 Railroad place, that city. The company has awarded the contract for the erection of a new garage on McKinley avenue, East Orange.

The E. R. Thomas Motor Branch Company, of Boston, is to have a new home, upon which it is planned to spend $200,000. It will be built at 915-921 Boylston street, on a site now occupied by tenement buildings. The exterior construction will be in French-Gothic style, with a façade of white, glazed terra cotta and large steel bay or show windows. The first floor will be occupied as show rooms, executive offices and dressing rooms, while the clerical force will be located upon a mezzanine in the rear. It is intended to have the new building ready for occupancy this fall. Turntables, said to be the largest ever built for the purpose, will be installed in the basement, second, third and fourth floors.

THE ELLIOTT GARAGE TURNTABLES

The private owner who builds his own garage must take the turntable proposition into consideration if work is to be facilitated upon his car, or cars. The Sterling-Elliott Company, of Newton, Mass., is making a specialty of wood- and steel-top turntables, which have many points of excellence to recommend them, not only to the private owner, but to the public garage manager as well. These tables are made in



Elliott Steel-Top Turntable

four sizes—12, 13, 14 and 15 feet in diameter, and are ball-bearing throughout. It is claimed for them that they run true, turn freely, are self-contained, require no oil, carry the heaviest cars without trouble and may be locked at any point. Drawings and specifications for any class of foundations are furnished upon request, so that an architect who is building a garage for a patron may incorporate one or more of these tables in his plans.

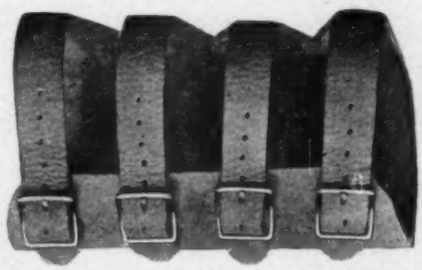
William L. Hibbard, of Milwaukee, Wis., has been appointed district representative of the Grabowsky Power Wagon Company in Wisconsin. Mr. Hibbard formerly was president of the W. L. Hibbard Motor Car Company, which handled the Chalmers-Detroit, Hudson and Thomas lines. Recently he has been associated with the Milwaukee branch of the McDuffie Automobile Company.

William Parkinson, the agent for the Overland and Marion in the Oranges, has leased the big fireproof garage formerly occupied by the North Jersey Motor Car Company, at 27 Washington place, East Orange.

The Regal car is now being handled in the Quaker City through a branch, the Philadelphia Regal Auto Company having succeeded the former agents, the Thomas M. Twining Company, at the same address, 330 North Broad street. R. M. MacCormack will manage the new branch.

ANTI-BLOW-OUT EMERGENCY PATCH

This handy device, which is manufactured by W. C. Davis, 1133 North Main street, Montello, Mass., will add considerable life



Anti-Blow-Out Davis Emergency Patch

to an old tire-shoe. It is made of unsplit horsehide, and will prevent weak places from blowing out. It is sold in sizes 3 1-2, 4, 4 1-2 and 5 inches for automobile use.

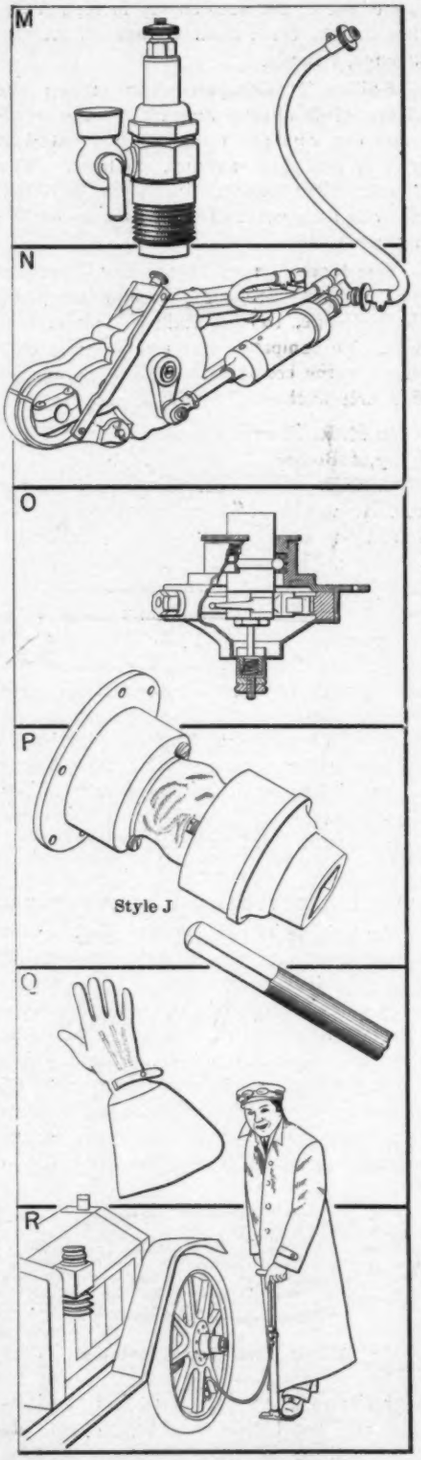
Worcester (Mass.) Motor Mart

Seen in the Show Window

WHILE sooty spark plugs may be more annoying to the aviator than to the autoist, they are yet sufficiently productive of profanity in the latter that any contrivance which promises to eliminate them, or even to materially minimize the nuisance, will be welcomed by the motoring fraternity with open arms. Such a device seems to be the All-in-One spark plug (M), now being marketed by the Buffalo Carbureter Company, of Detroit, Mich. Among the advantages claimed for these plugs are that by the mere opening of a stop-cock any accumulation of soot can be blown out instanter; a missing cylinder can be at once located by turning the petcocks; knocking in the motor can be stopped by priming with a few drops of kerosene, etc. This plug would seem to be just what is needed by the autoist who would sidestep the annoyances concomitant with imperfect gasoline combustion.

ALTHOUGH the development of muscle is all very well, and conducive to eager appetite and good digestive functions, it does not follow that the automobilist is so wedded to ancient, even if health-giving, customs that he will overlook the advantages inherent in such an article as the Quick Detachable Power Air Pump (N), recently put on the market by the Kellogg Manufacturing Company, of Rochester, N. Y. This pump will fill a tire in jig time, and while its use may deprive the exponents of healthy exercise of the doubtful benefits derivable from hand pumping, it is a mighty handy thing to have around when one is in a hurry. Its attachment to almost any make of car is only a matter of mounting a split gear on some exposed shaft. The jaws of the pump clamp over this gear.

IN view of the fact that it is considered desirable to have a double ignition system, it is common practice to employ a magneto in the main, and a battery with a spark coil and a timer for the auxiliary work. The section (O) of the Leavitt Improved Wipe Contact Timer, as here depicted, is offered by the Uncas Specialty Company, of Norwich, Conn., for this exacting work. It is said to be an improved form of Lacoste Timer, and one of the detailed refinements to which attention is called is in the shape of a supplementary ground terminal, whereby contact is rendered doubly sure. In addition to this electrical refinement, an adjustable ball bearing is utilized instead of a plain bearing. The two principal faults in the original Lacoste idea are in these ways removed.



M—The "All-in-One" Spark Plug
N—Kellogg Quick-Detachable Power Air Pump
O—Leavitt Improved Wipe Contact Timer
P—Blood Bros. Dust-Proof Universal Joint
Q—The Hansen Perfect-Fitting Gauntlet
R—The Stapley Compound Hand Air Pump

IT has been found that universal joints, as they have to do service in automobiles, are likely to give out much too soon unless they are protected from the silt of the road. It is no easy matter to furnish this protection, and afford all the other qualities besides. Blood Brothers Machine Company, Kalamazoo, Mich., who have long given matters of this sort attention, solved the problem in the manner as here indicated (P), which is of the Style J (double) joint. In addition to the dust-proof qualities which are obtained by fastening a leather boot between the two flange couplings, the joint is of substantial construction and may be adequately lubricated.

THE autoist who judges things by their utility only will not hesitate to invest when he can secure beauty of appearance along with the substantial quality which he always insists upon. This is especially applicable in the case of driving gloves, some of which are so undoubtedly built for service that all idea of dressiness seems to have been lost sight of. The O. C. Hansen Mfg. Co., of 335 East Water Street, Milwaukee, Wis., evidently had the dual idea of beauty and economy in mind in designing its No. 390 Auto Gauntlets (Q), which are made of a special tannage of black or tan leather or tan horsehide. They fit perfectly and do not cramp or bind the hands, being extremely soft and flexible. Being made with adjustable wrist strap and button fastener the wearer is enabled to have them tight or loose at the wrist, as he prefers. They are furnished with ventilated backs for summer use, if desired.

TO the legion of motorists whose cars are not equipped with power air pumps it is especially desirable that the hand pumps they carry are sufficiently powerful to deprive the work of filling tires of some of that onerousness which makes it hard labor. The Stapley Compound Pump (R), made by the Bridgeport (Conn.) Brass Company, whose headquarters are at 104 Crescent Avenue, is guaranteed by its makers to inflate tires quickly, easily and with little effort. Rustless because of its seamless brass tube cylinders, and positively non-leaking, its automatic tire valve-opener allows the tire valve to close without any loss of air.

HOW to keep the body finish up to standard is a difficult task and "Auto Renew Gloss" furnished in quarts by the Superior Specialty Company, Louisville, Ky., is regarded as effecacious for the purpose.